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LECTURE I.

INTRODUCTION.

MR. PRESIDENT, CENSORS, AND FELLOWS OF THE COLLEGE,—For the honour of entrusting me with the delivery of the Lumleian lectures for 1919 I desire to express my grateful thanks.

In 1581 Dr. Richard Caldwall, sometime senior student of Christ Church and President of this College in 1570, and John, Baron Lumley (1534–1609) founded a surgical lecture which was subsequently altered in the terms of the appointment and scope. It would appear probable that Caldwall was responsible for the original lines on which the lectureship was founded, as his only extant work is a translation of the "Tables of Surgerie," by Horatius Morus, a Florentine physician. Times have indeed changed since this lectureship was started; 300 years ago William Harvey had recently (1615) begun his 41 years' tenure of office, and in 1616 had given a complete survey of the circulation.

Cerebro-spinal fever has not, so far as I can make out, previously been taken as the subject of these lectures, and as it has become prominent during the war and has been the subject of numerous observations and much investigation it is, perhaps, appropriate to take a survey of our present knowledge of the epidemiology, clinical picture, and treatment of the disease in these three lectures. I have been so fortunate as to have seen the notes and many of the cases in the Royal Navy since the outbreak of war, and have freely utilised this material.

The official nomenclature of "meningococcal infection, varieties (*a*) cerebro-spinal meningitis, (*b*) posterior basal meningitis," only dates from the last revision published in 1918; before that the heading had always been "Cerebro-spinal fever, synonym epidemic cerebro-spinal meningitis," the only alteration ever made being the omission of the additional synonym "malignant purpuric fever," which made its sole appearance in the first edition of 1869. In the Manual of the International List of the Causes of Death (1911) based on the second decennial revision by the International Commission at Paris in July, 1909, cerebro-spinal fever is the third subheading of simple meningitis, and is separated from posterior basal meningitis which with a number of other meningeal diseases, is included in the first division of simple meningitis. It was perhaps a prophetic instinct that led the framers of our first nomenclature to place cerebro-spinal fever among the general rather than among the nervous diseases. For the title of these lectures, cerebro-spinal fever, though used in the same sense as, is perhaps preferable to, meningococcic infection, which might rather suggest a more considerable discussion of pathological and bacteriological problems than can properly find a place in these lectures which are now understood to be devoted to clinical medicine. By cerebro-spinal fever is meant meningococcic infection both in its general and local manifestations, meningitis being the most frequent and clinically important of the local changes.

HISTORICAL.

The first undoubted account of the disease is of an outbreak in and around Geneva in the winter of 1805 by Vieusseaux; by the next year it had spread to America and was described at Medfield, Massachusetts, by Danielson and Mann, who appear to have been ignorant of the epidemic at Geneva; and in 1806–7 the Prussian Army were attacked. In this country the first cases verified by necropsy were at Sunderland in 1830, but, as Ormerod[1] suggests, a group of cases, some with purpura, observed by Gervis[2] at Blackaton on Dartmoor in 1807 may have been of this nature. In 1827 Alexander Monro, in the course of an account of chronic hydrocephalus, described what is now known as posterior basic meningitis, but was not differentiated from tuberculous meningitis until 1878 by Gee and Barlow[3] in their paper on cervical opisthotonos in infants. In 1897 J. W. Carr[4] elaborated this distinction in his account of non-tuberculous posterior basic meningitis of infants.

As the acute disease was known as the "spotted fever" and as the "black death" confusion with other fevers of a malignant form, and especially typhus, has been inevitable, and this must be taken into consideration in connexion with any attempts to recognise descriptions of cerebro-spinal fever in the works of Hippocrates, Celsus, Paul of Ægina, and in other accounts written before 1805. Hamer[5] insists that Sydenham's description of the new fever (influenza) in 1685 portrays the clinical features of cerebro-spinal fever in 1915. Creighton[6] remarks that some symptoms of the epidemic fever of 1771 in Ireland suggest cerebro-spinal fever; and while admitting that the clinical accounts of the old epidemics would apply equally to typhus, enteric, or cerebro-spinal fever, Councilman, Mallory and Wright[7] point out that Sir John Pringle's account (in 1750)[8] of jail fever with suppuration about the brain is compatible with the interpretation that the cases were meningococcic meningitis. Impressed with the frequency and endemicity of the disease in parts of Central Africa, where few Europeans have travelled, Chalmers and O'Farrell[9] raise the interesting question whether the real home of the disease may not be Central Africa, whence it may have passed to Egypt, and so have been conveyed by carriers among Napoleon's soldiers to France and to America; but their search among old medical and other records of the Sudan has not been rewarded by any positive evidence in favour of their suggestion.

In the absence of bacteriological help, on which the accurate recognition of cerebro-spinal fever at the present day so absolutely depends, the diagnosis is open to so many fallacies that past records afford little evidence on which to form reliable conclusions. Thus, as late as 1865 such an authority as Murchison[10] stated that "the grounds for drawing a specific distinction between epidemic cerebro-spinal meningitis, or the spotted fever of America, and typhus are most inconclusive," and argued that the cases at Dantzic described by Burdon Sanderson were really typhus. Although there can be little doubt that it was not a new disease in 1805, and that, as Hamer says, the meningococcus was not born in that year, it is difficult to say more than this.

Increase of the Disease during the War.

It is unnecessary to detail the epidemics of the disease since 1805, as Hirsch did this up to 1884, and Bruce Low[11] continued the task from 1886 to 1916. Hirsch described four periods from 1805 to 1831, from 1837 to 1850, from 1854 to 1874, and from 1876 to 1882; some writers prolong the fourth period up to the present time, but it is probably better to start the fifth period from 1903. New York suffering severely in 1904–5, Silesia in 1905–7, France in 1909–10, and Texas in 1912.

In Great Britain 1907 was marked by outbreaks in Belfast (613 cases with 135 deaths) and in Glasgow (998 cases with 715 deaths) and in Edinburgh (206 cases with 135 deaths). No considerable outbreak occurred in England and Wales until the first year of the war; in 1912, when compulsory notification was permanently brought in, there were 272 cases with 142 deaths, in 1913 there were 304 cases with 163 deaths (B. Low), and in 1914 300 cases with 206 deaths. In 1915 there were 2343 cases with 1521 or 64·9 per cent., deaths; in 1916 1278 cases with 838 or 65·6 per cent., deaths; and in 1917, 1385 cases with 906, or 65·4 per cent., deaths (Reece[12]).

There is therefore no question as to the increase of the disease in this country after the outbreak of war. The cause, as will be discussed later, appears to be mainly the crowding together of young recruits in camps and barracks in conditions which, on the one hand, led to an increase in the carrier rate, and on the other, reduced the resistance of the individual. As the disease appeared on Salisbury Plain after the arrival of the first Canadian contingent, as four cases occurred in their camp at Valcartier, in Canada, in September, 1914, three on the way across, and some after their arrival, it was popularly suggested that the disease may

have thus been introduced into the country. This, of course, is quite untenable, for, as has already been mentioned, the existence of the disease in this country was well recognised. But it might be argued that the advent of the Canadian contingent aggravated the spread of the disease. Thus, at Portsmouth the disease began on Jan. 15th, 1915, at Eastney Barracks, among men who came in contact with a Canadian football team visiting there on Jan. 9th; this, however, may have been a coincidence, for the disease broke out simultaneously in other parts of the country, and none of the Canadian visitors were known to have been carriers.

The Medical Research Committee's Special Advisory Committee wrote that "the reports from the Salisbury Plain area suggest, not indeed that the Canadians imported a new disease ..... but that they did introduce a virulent strain of the meningococcus, and were in some degree responsible for its spread." Adami[13] vigorously controverts this, and points out that the strains obtained from the Canadian cases were identical with those isolated from purely British cases.

Epidemics vary much in their duration; from days and weeks to months, but usually last for six months. Dopter quotes examples of the persistence of the disease in towns for years; thus at Bayonne it lasted for seven years (1837–1843) and at Versailles for five years (1839–1843).

Change of Type of the Disease.

The question of the change of type of the disease acquires considerable interest from Dopter's[14] observation that in France the type of the infecting organism underwent a change during the European war; and Netter correlated the greater frequency of septicæmic cases and lesions, such as rashes, arthritis, iridocyclitis, with this alteration of the infection from Type A (Gordon's Types I. and III.) to Type B (Gordon's II. and IV.). This question is referred to later under the heading of meningococcic purpura without meningitis. Kennedy and Worster-Drought[15] investigated the relation of the type of meningococci to the clinical picture in 22 cases and found that 8 cases infected with Gordon's Type I were all very gravely ill, with a fatal issue in 6; that of 6 cases with Type III. some were severe and some moderately severe; and that the 8 cases of Type II. all recovered; of Type IV. there were no cases. These few observations suggest that Types I. and III. (Nicolle Type A) are more virulent as regards the meninges and Types II. and IV. (Nicolle Type B) specially prone to cause septicæmia and extra-meningeal metastases (vide also meningococcæmia). But in a recent small outbreak of 10 cases due to Type II., which was under my observation, the meningitic manifestations were very severe, and the mortality was 60 per cent. Adshead[16] analysed 49 cases in which Gordon's types of meningococci had been determined, with the object of ascertaining if there were any conformity between the type on the one hand, and the seasonal incidence, symptoms, and mortality on the other hand, but did not feel justified in drawing any definite conclusions. Observations on a large number of cases are necessary before coming to any final conclusion on the relation of bacterial strains and clinical symptoms.

EPIDEMIOLOGY.

Though it naturally attracts more attention when in epidemic form, cerebro-spinal fever is really endemic and smoulders on for years, breaking out under favourable conditions into epidemics. These endemic or sporadic cases bridge over the interepidemic periods and keep the disease from dying out. It is by the suppression and isolation of such cases that the disease should be finally eradicated. At and before the commencement of epidemic outbreaks the sporadic cases become more frequent, and it may be difficult to draw the line between an increased number of sporadic cases and an epidemic. It may, indeed, be doubted if even in 1915 there was a real pandemic of cerebro-spinal fever in this country; small outbreaks "affecting a number of persons simultaneously or within a short interval of time" (part of Greenwood's[17] definition of an epidemic) certainly occurred, but for the most part the cases continued to crop up at intervals or in couples. The special advisory committee upon bacteriological studies of cerebro-spinal fever during the epidemic of 1915,[18] adopting Dopter and Arkwright's[19] view, concluded that the epidemic is not one of cerebro-spinal fever as such, but what may be termed a "saprophytic epidemic" of the meningococcus in the throats of the population, cerebro-spinal fever being an epiphenomenon of this epidemic, due to a secondary systemic invasion from its saprophytic focus in the naso-pharynx, occurring in spare and isolated instances which, as a rule, appear unconnected with each other.

Seasonal Incidence.

In this country the vast majority of the cases occur during the first six months of the year, the numbers falling to a low level during the summer months, thus contrasting with acute poliomyelitis, and not rising again until the end of December.

Among 3621 cases occurring in England (including London) and Wales during 1915 and 1916 Colonel R. J. Reece found that there were in the first quarter of the year 1355, or 37·4 per cent.; in the second 1444, or 39·6 per cent.; in the third 448, or 12·4 per cent.; and in the last quarter 374, or 10 per cent. Thus, in the first six months of the year 77 per cent. of the cases arose. Among the 509 cases in the Navy during the first four years of the war 293, or 58·5 per cent., arose in the first quarter; 120, or 23·5 per cent., in the second quarter; 43, or 8·4 per cent., in the third; and 48, or 9·4 per cent., in the fourth quarter of the year. Out of the total 509 cases, 353, or 69 per cent., occurred during the first four months (1915–18), and during the first half of the year 418, or 82 per cent.

The disease, however, never disappears entirely; in 1915 and 1916 cases occurred in every month of the year (Reece). The seasonal prevalence probably depends on a number of accompanying factors; thus, cold and wet may act indirectly by causing overcrowding and close contact, want of fresh air and of proper ventilation, sore throats, and other catarrhal conditions. These conditions favour increase of the carrier rate, which, when it reaches a percentage of 20 (Glover), is followed by the appearance of cases of cerebro-spinal fever. This much appears fairly clear, but the further question arises as to the direct influence of meteorological conditions in favouring the systemic invasion by the meningococcus; in other words, of inducing a sudden outbreak of cases in epidemic form; this might depend on (*a*) diminished resistance of the individual or (*b*) increased virulence of the meningococcus.

As the winter (January to March) and spring are the periods of the year during which the disease is unusually prominent, *meteorological conditions* might naturally be expected to exert a definite influence on its incidence, and cerebro spinal fever might be regarded as a weather disease; thus, east and north winds and a low temperature, especially sudden falls and oscillations of temperature, might by reducing the resistance of carriers and persons exposed to meningococcic infection lead to systemic infection. Sudden alterations in the atmospheric temperature have been emphasised by Sophian[20] and Dopter[21] as responsible for the outbreak of cases, and I got the same impression when at the Royal Naval Hospital, Haslar, August, 1914–17, though, as will be seen below, a comparison of the incidence of the cases and the temperature conditions in the early months of 1915 did not justify this view. I investigated the points mentioned above in connexion with 93 cases occurring at large naval depôts during the first three months of 1915, but did not obtained results justifying a positive conclusion.[22]

From comparison of the monthly incidence of cerebro-spinal fever with the prevailing winds, it at first appeared that there was some evidence to support the preconceived view that northerly and easterly winds favour the occurrence of the disease. At Portsmouth, Plymouth, and Deal cases of the disease followed in the wake of north and east winds, but at Chatham no decided conclusion as to the influence of winds was forthcoming. The direction of the wind on (*a*) the day of onset of the disease; and (*b*) on the three previous days was then plotted out for 93 cases occurring at Portsmouth, Plymouth, Chatham, and Deal. On the actual day of onset the wind was more or less east or north in 50 cases, and south, west, or calm in 43. On the three days before the onset of the disease the wind was more or less east or north in 47, south or west in 35, and in 11 cases varied during the three days. On the whole, there is not sufficient evidence that east and north winds play an important part in causing an outbreak of the disease.

The question of the atmospheric temperature was gone into. In some, but not in all instances, the months with the lowest average daily temperature showed the largest number of cases of the disease, but the difference in the average daily temperatures was so comparatively small that no conclusion as to its influence is justified.

The influence of a sudden fall of temperature was next investigated. The temperatures (day and night) for three days before the onset of the disease in 93 cases from Portsmouth, Plymouth, Chatham, and Deal were examined in order to see if there was a sudden fall of temperature of 10° F. or more within this period. Out of the 93 cases there was such a fall in 37 only. There is, therefore, no reason to believe that a sudden fall of the atmospheric temperature causes an immediate outbreak of the disease.

On the other hand, from investigation of an epidemic at Hong-Kong in the early months of 1918 Olitsky[20] found that a sudden fall of temperature was followed in about four days by a great increase in the number of cases reported, and that absence of sunshine had the same effect.

Finally, an inquiry was made as to the relation between the prevailing wind and the average daily temperature combined and the incidence of cerebro-spinal fever. Consideration of the monthly incidences of 82 cases of cerebro-spinal fever with the prevailing winds and the average daily temperature for January to March at Portsmouth, Plymouth, Chatham, and Deal shows that 40 cases occurred in February, during which the prevailing wind was south-west and the average daily temperature 43·5°, whereas in January (20 cases) the wind was west or south west in the first half and north or north-east in the second half, and the average daily temperature 43·7°; in March (22 cases) the prevailing wind was north-east and the average daily temperature 45°. There was not, therefore, any real evidence that north and east winds and a low atmospheric temperature played a causal part in the outbreaks of cerebro-spinal fever.

Various Views on Effect of Weather Conditions.

According to Compton,[24] the conditions favouring invasion of the blood-stream by the meningococcus are a high degree of sudden saturation of the atmosphere with moisture and very little variation in the daily temperature of the air, the meningococcus being present; and Sophian states that during the outbreak of 2180 cases in New York in 1905 the weather was cold and wet. Olitsky, however, considered that humidity and rainfall did not exert any influence on the number of the cases. Closely connected with the humidity are the atmospheric pressure, the rainfall, and deficiency of sunlight; and 69 per cent. of Compton's cases occurred contemporaneously with a fall of the barometer, 91·5 per cent. with rain, and 82 per cent. with deficient sunshine. The high atmospheric humidity may conceivably act in several ways: (*a*) It may render the mucous membrane of the naso-pharynx more spongy and so more permeable to meningococci; (*b*) as the organism grows best in plenty of moisture at a temperature of 37° C. the inhalation of moist air, which slightly raises the bodily temperature, may provide the most favourable conditions for growth, it being well known that drying has a very depressing effect on the vitality of the meningococcus; (*c*) in addition, as a humid atmosphere diminishes evaporation and as a result of this the exudation of fluid from the nasal mucous membrane, the meningococci are less readily removed. On the other hand, from observations at Camp McClellan, Robey[25] came to the conclusion that cold and wet weather increased the carrier-rate and the incidence of cases on account of the closer contact of the men in the tents and mess-halls, and that, conversely, warm fresh air and sunlight had a powerful effect in diminishing the carrier-rate.

Sophian's analysis shows that most of the epidemics occur in exceptionally cold weather, but this relation is not constant, as some occur in quite mild conditions, and Dopter considers that continued cold is less provocative than sudden oscillations of temperature. In order to explain the simultaneous outbreak of cases of the disease in distant foci Netter and Debré[26] suggest that certain cosmic influences may combine to raise the virulence of the meningococcus, and that variations in its virulence comparable to those described for the pneumococcus occur.

In 1894 Herringham[27] showed that the meteorological conditions which when met with together caused an outbreak of pneumonia were (1) a wide daily range of temperature, (2) a dry condition of the air, and (3) an east wind. As these conditions do not, from what has been said, appear to bear a constant relation to the incidence of cerebro-spinal fever, it would be interesting to compare the curves of cerebro-spinal fever and pneumonia. This has been done by Newsholme,[28] who found that for three out of the four years of the war the curves closely corresponded, but that in July, 1918, there was an epidemic peak in the pneumonia curve but not in the cerebro-spinal curve. He concludes that the same winter and spring conditions favour the incidence of both. By plotting out the weekly mortality returns of the Registrar-General for the last few years I find that there was a correspondi g rise in the incidence of cerebro-spinal fever in the early part of the year, but that the rise of pneumonia in the last two months of the year was not accompanied by a rise in the cerebro-spinal fever curve.

Unless it can be convincingly proved that the outbreaks of cerebro-spinal fever can be closely and accurately correlated with changes in the meteorological conditions—and that it is not so is clear from the confusing details just given—it becomes more probable that the conditions prevalent during the months of greatest incidence act by increasing the carrier-rate or the power of carriers to spread infection—namely, by coughing or by both means—and so exposing a larger number of possibly susceptible persons to the opportunity of systemic infection. Glover has shown that with a high carrier-rate the disease breaks out. The conditions favouring a high carrier-rate are (*a*) prevalence of colds and coughs, which enable existing carriers to infect others; (*b*) close contact of individuals such as occurs in cold weather. Overcrowding has been shown to be a factor of almost constant occurrence in outbreaks of the disease. Of course, neither catarrhal infections nor overcrowding is effective without the presence of carriers, but a varying number, 2–5 per cent., will always be found in any considerable collection of persons.

Dust.—The epidemic in 1907 at Leith occurred during cold, dry, dusty weather and Robertson,[29] as Buchanan[30] had previously done in India, suggested that meningococcic infection may be due to air-borne dust. As it is now known that drying rapidly destroys the meningococcus, it would appear that the part, if any, played by dust is to set up cough, and so render carriers more active in the spread of the infection.

ÆTIOLOGY.

In this country our unpreparedness for war and the necessity for rapidly raising large armies led to overcrowding of the inadequate available barracks and depôts.

Overcrowding.

Overcrowding is well recognised as an important factor in the ætiology of cerebro-spinal fever and exerts its influence in several ways: it impairs the general health, favours the occurrence of various infections, especially influenza and catarrhal infections of the throat and upper respiratory passages, which may dispose to meningococcic invasion, and greatly increases the carrier-rate among the occupants of the crowded rooms.

Overcrowding in military barracks has been defined by Dr. J. A. Glover[31] whose valuable deductions in relation to cerebro-spinal fever will be freely utilised, as the slightest excess over the mobilisation standard, which, as a rule, is an excess of 50 per cent. of the number of men allowed by the peace standard. The peace standard, according to the Royal Commission of 1861, provided 600 cubic feet per man and a space of one yard between the beds. The important points of overcrowding are the space between the beds and the efficiency of ventilation, the mere cubic space being an index rather than a vital factor. With the peace standard of one yard between the beds the percentage of meningococcic carriers is rarely more than 5, with the mobilisation standard of 1 ft. 4 in. between the beds the percentage of carriers may be 10, with a space less than 1 ft. 20, and when the space is less than 9 inches the carrier-rate is 28–30 per cent. Overcrowding increases the carrier-rate, the maximum being reached in three weeks; a carrier-rate of 20 per cent. is a danger-signal and is soon followed by the occurrence of cases of the disease and by a well-marked increase in the proportion of meningococci that are agglutinable. In January, 1918, at a certain military depôt, Glover found the carrier rate both among contacts and non-contacts as high as 70 per cent. In such overcrowding the remedy of increasing the space between the beds to 2½ feet is followed by a reduction in the carrier-rate, but not so rapidly as the rise due to overcrowding.

The experience of the American Expeditionary Force, for which I am indebted to the courtesy of Lieutenant-Colonel Haven Emerson, shows that the conditions of ocean transport involving great concentration of men in close, ill-ventilated quarters between decks and conditions contributing to a pronounced lowering of body resistance were responsible

for the high incidence of the disease among the troops on arriving at the disembarkation ports in France and Britain, for up to the stoppage of troop shipments in November, 1918, not less than 50 per cent. at all times, and frequently 80 per cent., of all the cases of cerebro-spinal fever reported among the American troops in Europe were in men within two weeks of landing.

Fatigue.

Fatigue is a factor of importance in causing outbreaks of the disease, and together with want of sleep and exposure reduces the bodily resistance and so opens the way to infection. Dopter[32] quotes a remarkable incident from the Versailles epidemic of 1839, during which out of a detachment of 153 recruits 79 developed the disease after a fatiguing march. He also refers to the increased frequency and mortality of the disease among recruits after forced marches during the European war, and points out that recruits suffer much more on account of their lack of training than soldiers of two or three years' service, though of the same age. Examination of the notes of naval cases shows that in a number of cases the disease began shortly after going on leave or returning to barracks; the fatigue of the journey may have played a causal part.

The Relation to Campaigns.

This question naturally arises in connexion with the great increase of the disease in this country since 1914. In the past it has not, like dysentery and enteric, been considered a war disease. Osler[33] points out that there is no reference to it in the Napoleonic, Crimean, Italian, or Danish wars, there were but a few cases in the Franco-Prussian, Russo-Japanese, and South African wars, though in the North and South American Civil War of 1861–3 there were outbreaks of moderate dimensions on both sides.

As there is little information as to the increased prevalence of the disease during previous wars, it may be interesting to quote the available details as to the present campaign. According to Galambos,[34] though there have been sporadic cases in the various theatres of war there have not been any epidemics among the German soldiers. In the French troops the disease has not, generally speaking, been common; in 1915 there were 1075 cases, or 4·3 per 10 000; in 1916 there were 451, or 1·8 per 10 000, and in 1917, 406, or 1·5 per 10 000. Dopter[35] explains the low incidence at the front by the open-air life and the comparative freedom from overcrowding, and contrasts the conditions with those in camps at the base.

By the kindness of the Director-General of the Army Medical Service I am enabled to say that the incidence in the Army in this country was as follows: From Sept. 19th to Dec. 31st, 1914, 50 cases, with a mortality of 31, or 60 per cent.; during 1915, 1195 cases, with 586 deaths, or 49 per cent.; during 1916, 967 cases, with 430 deaths, or 44·6 per cent.; and during 1917, 1337 cases, with 593 deaths, or 44·3 per cent. In the British Expeditionary Force in France the disease began to appear widely in a scattered fashion, so that two cases hardly ever came from the same unit, in January, 1915, or at the same time as the troops in this country were attacked. Herringham[36] estimates that the outbreak in 1915, when, as in this country, the available serums were useless, was the worst, with a mortality of about 50 per cent., but that during the war the mortality probably never fell below 35 per cent. I am indebted to the courtesy of the Director-General of the Army Medical Service for the information that the annual ratio of cases of cerebro-spinal fever per 1000 admissions was 63 in 1915 and 31 in 1916. I am much indebted to Colonel J. G. Adami's lecture at the Royal Institution for the figures of the Canadian Expeditionary Force: out of a total of 420 000 officers and men from 1914 to 1918 there were 367 cases with a mortality of 198, or 54 per cent. Lieutenant-Colonel B. Myers has very kindly provided me with figures showing the monthly incidence among the New Zealand Expeditionary Force from July, 1917, to September, 1918; there were 75 cases with 24 deaths, or 32 per cent., among a strength varying from 14 000 to 21 000. Colonel R. J. Millard kindly informs me that among the Australian Force in the United Kingdom there were in 1916 65 cases with 29 deaths, or 44·6 per cent; in 1917 out of an average strength of 64 431 officers and men 104 cases with 36, or 34·6 per cent., deaths; and in 1918 out of an average strength of 66,186 23 cases with 12, or 52 per cent., deaths.

In a list[37] of 42 diseases arranged in the order of their importance in causing days of sick wastage among the American Expeditionary Force during the year ending May 31st, 1918, meningitis and carriers were item No. 27. I am indebted to Lieutenant-Colonel Haven Emerson and Captain T. J. Duffield for the –

Incidence of Meningococcus Meningitis in U.S. Forces in France.

Year.	Month.	Average strength.	No. of Cases.	Rate per 100,000.
1917	June.	7,180	0	0·0
,,	July.	16,055	5	31·2
,,	August.	27,703	5	18·0
,,	September.	50,100	5	10·0
,,	October.	75,675	5	6·6
,,	November.	107,875	40	37·1
,,	December.	151,498	27	17·8
1918	January.	196,591	33	16·8
,,	February.	231,602	51	22·0
,,	March.	283,405	35	12·4
,,	April.	372,843	49	13·1
,,	May.	541,543	61	11·3
,,	June.	772,817	40	5·2
,,	July.	1,034,177	34	3·3
,,	August.	1,310,233	58	4·4
,,	September.	1,634,457	143	8·7
,,	October.	1,811,402	526	29·0
,,	November.	1,925 206	204	10·6
,,	December.	1,904,252	235	12·3

During the war the disease first became prominent among the military population in this country, and then the civil population followed suit; the increase in the incidence of the civil cases during the war is striking: in 1915 the number of civil cases was eight times that of 1914, and in 1916 and 1917 four times that of 1914 (Reece).

That the greater incidence since the outbreak of war is due to some special conditions is obvious, and probably one of the most important is overcrowding in barracks; it is a disease not of the open campaign but of training camps, mobilisation centres, and depôts. This is to some extent borne out by the incidence of the disease in the Naval depôts as contrasted with ships, where, however, the life is by no means the same as that in the field: among 509 cases in the Royal Navy during the first four years of the war 59, or 11·6 per cent., occurred in sea-going ships, and 363, or 71 per cent., at the large depôts at Portsmouth, Plymouth, Chatham, and Crystal Palace. But the comparatively low percentage of cases in ships may be due to other factors, such as the longer service of the men as compared with the new entries in barracks who form such a large proportion of the cases. Other unusual conditions bearing hardly on young soldiers are excessive fatigue, recurrent infections.

Recruits and New Entries.

The above are specially affected; thus in 1914–15, out of 15 cases at the Royal Naval Barracks, Devonport, 14 were new entries with an average service of 24 days (7 with less than 20 days' service). In 1916–17 out of 143 cases in the Navy, 31, or 21·7 per cent., occurred within three weeks of joining the service, and among 46 occurring in Portsmouth further analysed by Fildes and Baker[38] 36, or 78 per cent., were new entries—namely, those who had been in the service for a few days or at most a few weeks. These authors, like Dopter, concluded that recent entry was a more important factor than age.

Occupation.—Recruits and young children are specially prone to be attacked; miners have also been stated to suffer more severely than other workers.

Trauma.—Blows on the head causing fracture of the base have been thought to play an important part by allowing a direct passage of meningococci from the naso-pharynx or sphenoidal sinus to the meninges. Short of fracture, it might reasonably be thought that any cranial damage or injury would, by diminishing resistance, favour the localisation and multiplication of meningococci present in the blood stream. There are comparatively few cases showing the sequence of cranial trauma and cerebro-spinal fever.

Antityphoid inoculation and ordinary *vaccination* have been followed by the disease and may, by reducing the resistance,

favour infection. Antityphoid inoculation has been followed by a relapse, and it is possible that this may occur in abortive and latent cases of meningococcic infection. In the Navy vaccination is usually carried out shortly after entry, and, as mentioned elsewhere, the majority of the cases occur in new entries. Acting on the assumption that vaccination may be one of the factors favouring the incidence of the disease in new entries, vaccination has at times been postponed, but the disease has occurred in new entries who were not recently vaccinated or revaccinated.

Relation of Influenza and other Infections, especially Catarrhal Affections, to Cerebro-spinal Fever.

Influenza may be considered in relation to cerebro-spinal fever from three points of view: as specially related to it; as, in common with other diseases, depressing the resistance of the body and so rendering it liable to infection; or as, in common with other diseases of the respiratory tract, spreading the infection and increasing the carrier rate by coughing and sneezing.

From historical and epidemiological considerations Hamer [39] argues that cerebro-spinal fever is a sequel or complication of influenza, it being assumed that in special circumstances some individuals when attacked by influenza develop cerebro-spinal fever; he appears to believe that the meningococcus is not the cause of cerebro-spinal fever, although it may assume importance when activated by some "unknown influence" temporarily endowing it with virulence, and that there is one common infecting agency for influenza, cerebro-spinal fever, poliomyelitis, and other epidemic diseases; this appears to be his interpretation of the more ordinary view that the meningococcus is widely present in the throats of the general population, and at times undergoes enhanced virulence due to some unknown influence—telluric, climatic, or other. This broad view is so opposed to bacteriological concepts and to the general experience that it is difficult to entertain it without further and very convincing evidence. Bacteriologically it is true that cases of mixed infection with *B. influenzæ* and the meningococcus occasionally occur, as has been seen in the recent epidemic of influenza, Glover,[40] Whittingham,[41] and Fletcher [42] describing such cases without meningitis; but this does not prove that the meningococcus and the influenza bacillus are the same or forms in the life-history of the same organism. From the historical and epidemiological point of view the evidence of the association of the diseases is not very convincing—at any rate, since the influenza pandemic of 1889, as, apart from the local epidemic in 1907, it is only since the outbreak of war that cerebro-spinal fever has been frequent in this country; even since 1914 the association of the two diseases has not been constant.

In a diagram showing the four-weekly incidence of cerebro-spinal fever and of pneumonia in the British Army in the United Kingdom and the deaths from influenza in London during the four years 1915–18 Newsholme points out that there is a close correspondence in the curves of these three diseases during three out of the four years, and that there can be little doubt that the same spring and winter conditions favoured excess under all three headings; but in July, 1918, there were epidemic peaks in the curves of influenza and pneumonia, but not in that of cerebro-spinal fever. Later on, however, Newsholme mentions that in 1915 there was an influenzal epidemic of low range in the eighth week of the year, and in 1916 a relatively small epidemic culminating in the last week of the year and terminating early in 1917. These outbreaks do not correspond exactly with those of cerebro-spinal fever, which were more severe in 1915 and (to a lesser degree) in 1917 than in 1916.

In the case of the Navy during 1918 there was a want of correspondence between the incidence of influenza and cerebro-spinal fever; in May and June influenza was rife, but there was no rise in the curve of cerebro-spinal fever. Later in 1918 a more virulent epidemic of influenza occurred, and while this was in its early stage the number of naval cases of cerebro-spinal fever rose, so that in October there were 21 cases as compared with 3, 3, and 0 in the three previous years, and at one depôt where influenza was raging seven cases of cerebro-spinal fever occurred within a week. Another example of what appears to be a direct effect of influenza, namely, a local explosive outburst of cerebro-spinal fever, may be mentioned; in February, 1919, among a number of naval officers in the same ward for influenza, eight cases of cerebro-spinal fever occurred in a few days. There was no known case of cerebro-spinal fever in the neighbourhood of the hospital, and presumably a carrier in the ward had become actively infective from the cough of influenza.

During the height of the influenza epidemic in October, 1918, there was a notable increase in the incidence of cerebro-spinal fever among the heavily infected (influenza and pneumonia) American troops arriving in France from the United States, as is shown in the figures already quoted. The second wave of influenza, in October, 1918, was much more severe in its complications and secondary infections, and it seems reasonable to explain the increased incidence of cerebro-spinal fever as the result of a lowering of the bodily resistance and an increased susceptibility to infection by the meningococcus.

The part played by influenza would then be analogous to that of other diseases and depressing conditions that have preceded and been thought to dispose to meningococcic infection, such as measles, rubella, mumps, and also menstruation in women, and the status lymphaticus. But as influenza may be overwhelmingly common it may be correspondingly more often followed by cerebro spinal fever, and it would appear that when cerebro-spinal fever becomes more frequent or occurs in explosive outbursts after influenza the two obvious factors are impaired resistance and the presence of a chronic carrier with an influenzal cough which thereby facilitates the spread of meningococcic infection.

Colds and Catarrhal Affections.

The relation of colds and catarrhal affections to cerebro-spinal fever may be considered from two points of view: (*a*) The relation of preceding colds and catarrhal affections to individual cases of cerebro-spinal fever; and (*b*) the relation of the prevalence of colds and catarrhal affections to outbreaks of cerebro-spinal fever.

(*a*) Opinions differ widely as to an antecedent naso-pharyngeal catarrh in cases of cerebro-spinal fever, both as to its occurrence and when it is present as to its nature. Sophian believed that the meningococcus always causes a naso-pharyngitis, so that there is an initial catarrhal stage of the disease, and has been followed by Lundie, Thomas, Fleming, and MacLagan,[43] who recorded it as universal in 170 cases. Horder regards it as a cardinal symptom, and Herrick found it in a considerable proportion of his cases. On the other hand, it was present in very few of Sheffield Neave's 73 cases, in 25, or 40 per cent., of Worster-Drought and Kennedy's 62 cases, and is stated to be rare by Foster and Gaskell. It is quite conceivable that naso-pharyngeal catarrh may dispose to infection by meningococci, and there is some evidence that adenoids, which are so commonly associated with naso-pharyngeal catarrh, favour infection (Rosenthal [44]). Cleminson [45] found that carriers on an average had 50 per cent. more adenoid tissue than normal subjects. C. Shearer [46] finds that nasal mucus favours the growth of meningococci; this may depend on the presence of bodies of the type of accessory growth hormones (vitamines) which are present in blood, serum, and animal fluids, and have been shown by Miss D. Jordan Lloyd [47] to be necessary for the growth of the meningococcus in vitro. On the other hand, a profuse catarrhal discharge may remove the meningococcus before it can settle down on the inflamed surfaces (Crowe).

(*b*) The special Advisory Committee of the Medical Research Committee on the bacteriological studies of the epidemic in 1915 considered that the relation with catarrhs and the disease was fortuitous as both have a similar seasonal prevalence, the relation being the same as that between catarrh and the prices of coal. On the other hand, the view that catarrhal throat affections by inducing coughing and sneezing spread meningococcic infection and so increase the carrier-rate and the chances of systemic infection, as urged by Pringle,[48] seems highly probable. The prevalence of colds in the population would thus favour the outbreak of cerebro-spinal fever, but it is not necessary that cerebro-spinal fever patients should have had colds or naso-pharyngitis.

Recent Acute Affections.

The depressing effect of recent acute infections, such as influenza, mumps, measles, has been mentioned as a probable factor in disposing persons to meningococcic infection; this, however, is much less important than overcrowding. Among

the naval cases previous acute disease, such as measles, rubella, and mumps, occurred in a small percentage only.

The sequence of events in the two following cases is perhaps worthy of mentioning. Two brothers from the Fair Isle, Shetland, had measles in September, 1915, in Haslar. One developed cerebro-spinal fever 13 days after the onset of measles and died. The other, who had never been well since the attack of measles, died in Haslar three months later from tuberculous meningitis. In both cases a necropsy was made.

Herrick lays stress on the occurrence of previous acute disease; among his 208 cases 26 had recently had measles, 15 mumps, and among another series in another American camp the percentage was almost the same—13 of measles and 8 of mumps among 112 cases (Miller and Martin [49]). The occurrence of meningococcic meningitis after mumps, in which a lymphocytic reaction of the meninges is extremely common, suggests that this disease may render the meninges particularly susceptible to infection. Symmers [50] found that the subjects of status lymphaticus were especially prone to meningococcic infection, and this may be correlated with H. C. Cameron's view that the status lymphaticus is the result of a chronic infective condition. But in their account of the Australian outbreak Fairley and Stewart [51] state that nearly all the patients were in good health before the attack and that the large number of fine young men struck down was most remarkable.

Influence of Age and Sex.

Age is an important ætiological factor; the most susceptible age is from birth to 5 years, and in some epidemics 80 to 90 per cent. of the patients have been under 15 years of age; in the Dantzic epidemic of 1865, for example, 93 per cent were under this age. It is generally estimated that half the total cases occur in the first five years of life; in England and Wales during 1914 51·4 per cent. of the cases were in children under the age of 5 years and 72·4 per cent. under 10. But in 1915 and 1916 these percentages (30 and 48·8, and 33·7 and 54·8 respectively) were much lower, although the military cases are not included (Reece). Compton [52] connects the greater fragility and delicacy of the naso-pharyngeal mucosa in children with their susceptibility to infection. In a chart of 750 cases among the Chinese population at Hong-Kong the peaks of the curve of incidence were: (*a*) from infancy to 5 years; and (*b*) at the age of 17½ years (Gale [53]). Though common in infants cerebro-spinal fever is rare during the first three months of life, and at this period meningitis is more often due to *B. coli* than to other micro-organisms; among 19 cases of meningitis in the newly born, collected by Barron, [54] one only was meningococcic, and among 20 more under the age of 3 months four were meningococcic. According to Compton [55] the least susceptible age is between 35 and 40 years. Children and recent recruits are the members of the community most frequently attacked, but in the case of the latter their environment rather than their age is the determining factor.

Sex in itself is often stated not to exert any influence on the incidence of the disease, but among the civil population during 1914, 1915, and 1916 Colonel Reece found that the total number of males exceeded that of females, the percentage of males being 57·7 53·9 and 54·4. This predominance of male incidence was shown in practically all the age-periods; the exceptions were the age-group 20–30 in 1915 and 1916 and the age-group 30 and over for 1916. It seems probable that the abstraction of a large number of males from the civil population would explain this; at any rate the incidence of attack on these age-groups would be far heavier on males than on females if the military and naval cases were included. In the epidemic of 1918 among the Chinese population of Hong-Kong males were attacked slightly more than twice as often as females. Why males, especially males in early life, are more prone to attack is not certainly known, but it is natural to explain it by their environment and greater liability to overcrowding.

SPREAD OF INFECTION.

Granting that the meningococcus is the cause of cerebro-spinal fever and that so far man is the only recognised carrier, it follows that the disease is always conveyed by a healthy carrier or by a patient with the disease. Patients are almost always confined to bed and their sphere of infectivity thus much restricted, and the rarity with which one case can be traced to another proves that infection is usually due to contact with a healthy and often unrecognised carrier. Of the carriers, the chronic ones, who are commonly so in virtue of an infected accessory sinus, adenoids, or other focus, are much more powerful for harm than the ordinary carriers whose term of activity is usually not more than three weeks. Robey, [56] indeed, found that a chronic carrier can usually be found among the contacts of a case of the disease.

The actual spread of infection is mainly due to droplets expelled from the naso-pharynx in coughing, sneezing, and violent expiratory efforts, so that the carrier's power for harm depends on the existence of cough, &c., on the number of meningococci, and also largely on their being of an epidemic type. Infection may also be conveyed directly from mouth to mouth, as in kissing. The question of the importance of prostitutes as meningococcic carriers requires investigation. Other methods of spread of infection are less important or very doubtful. Adami [57] has recently advocated the spread of infection through the intermediation of drinking vessels, partially or imperfectly rinsed, in crowded canteens and refreshment booths. For this indirect method of infection carriers are of course necessary, unless it be assumed that the disease only passes from one case to another, and this is incompatible with the history of isolated cases. The spread of infection by sputum, through flies or insect carriers, or by clothing is improbable from the low vitality of the meningococcus and its rapid destruction by drying.

When a carrier lives in close contact with healthy individuals the carrier state is prone, especially under conditions of overcrowding, to be conveyed to others, and these new carriers act in like manner. Among the individuals thus exposed some may, from diminished resistance, become systemically infected, and, as Glover has shown, this should be expected when the carrier-rate, which is normally under 5 per cent., rises to the danger-line of 20 per cent. That the infectivity of the meningococcus is low or the general resistance to it high is shown by the remarkable infrequency with which doctors and those in attendance on patients contract the disease and by the rarity of the spread of the disease when a patient is nursed in a general ward. It is said in explanation of the rarity with which nurses and attendants are infected that the meningococcus usually disappears from the naso-pharynx about the fifth day of the disease (Flügge).

The low infectivity is also shown by the generally acknowledged difficulty in tracing cases to contact with other cases and by the comparatively isolated incidence of the cases which occur sporadically more often than in groups. Thus, among 3617 cases in 1915 and 1916 Reece found that 3402 were single cases and 100 instances of multiple cases in a house; but occasionally several cases may occur in the same family; Scott [58] records four deaths in one day out of a family of seven children from fulminating cerebro-spinal fever. A number of cases may occur at the same time without any obvious connexion between them, as if due to some meteorological influence, though the presence of a dangerous and chronic carrier may very probably be the real explanation. The carrier-rate is from 10 to 20 times higher than the incidence of the disease.

THE PATH OF MENINGEAL INVASION.

The path by which the meningococci reach the meninges has been thought to be (1) direct invasion of the cerebral meninges from the naso-pharynx and accessory sinuses via the lymphatics; (2) lymphogenous infection of the meninges along the spinal nerve-roots; and (3) invasion of the blood-stream by meningococci from the portal of entry in the naso-pharynx and, subsequently, infection of the meninges, for which the meningococci have a special predilection.

Direct Invasion from Naso-Pharynx and Accessory Sinuses.

As the meningococcus is relatively such a common inhabitant of the naso-pharynx the analogy of otitic meningitis naturally suggested the once widely held view that the infection spreads directly to the base of the brain. As far back as 1883 this view was originated by Weigert and Weichselbaum's observation that at necropsies the nasal mucosa was inflamed and covered with muco-pus. The following routes have since been advocated:—

(*a*) Through the sphenoidal sinuses; this was the early view of Westenhoeffer, [59] based on the observation that in

one-third of 29 necropsies these sinuses showed inflammation; subsequently, he gave up this opinion as a result of failure to discover meningococci in the substance of the sphenoid bone, and in 1909 Elser and Huntoon [60] also failed to find meningococci in the sections of the walls of the sphenoidal sinus and of the hypophyseal region of the skull. Recently, however, Embleton and Peters [61] described meningococci in the bony walls of the sphenoidal sinus and in the contained pus; and Holden [62] recorded a case with the sphenoidal sinus full of muco-pus containing meningococci, osteomyelitis of the sphenoid, discharge of pus into the sella turcica, and periostitis over the area covered by the pons and pituitary. But in 25 necropsies Worster-Drought and Kennedy [63] were unable to find any evidence in support of the direct spread of infection from the sphenoidal sinuses, and they point out that when sphenoidal suppuration is associated with meningococcic meningitis it may be secondary.

(*b*) Transethmoidal route. Communications through the cribriform plate of the ethmoid, between prolongations of the pia-arachnoid and the lymphatics of the nose, allow the virus of acute poliomyelitis to pass between the naso-pharynx and the cerebral meninges. Flexner [64] found that when this virus is introduced into the naso-pharynx of experimental animals the disease results, and in 1917 considered that meningococci probably passed along the lymphatic connexions around the olfactory nerves, thus supporting the contention put forward by Netter and Debré [65] in 1911 that meningococci pass from the nose through these communications direct to the base of the brain. So far experimental proof is wanting; Austrian [66] found that the introduction of meningococci into the naso-pharynx of rabbits did not cause meningeal infection either in normal conditions or even when the meninges had previously been irritated and rendered congested.

(*c*) Through the Eustachian tube to the middle ear and so to the brain. This route is rendered unlikely by the rarity of otitis media in cerebro-spinal fever, and by its late occurrence when it does occur. I have seen a mixed meningococcic infection in otitic meningitis, but this is quite exceptional.

Lymphogenous Infection along the Spinal Nerve Roots.

Lymphogenous infection of the spinal cord by the passage of meningococci along the lymphatics of the spinal nerve roots in the cervical, thoracic, and abdominal regions, resembling that described in some cases of Heine-Medin disease, was suggested by Stuart McDonald,[67] who was led to this conception by Greenfield's teaching that in tuberculous meningitis the cord lesions may be older than the cerebral. McDonald postulated spread of the meningococci to the cervical glands to the lungs, or by swallowing to the intestines and mesenteric glands, and then extension along the perineural lymphatics to the meninges. Impressed with the frequency of enlarged and inflamed Peyer's patches in children dying of the disease, Radmann [68] considered that the intestine was the portal of entry.

Fowler [69] supported the view that cerebro-spinal fever is due to an acute abdominal infection on the grounds that (*a*) the spinal cord lesion is the oldest; (*b*) that the abdominal reflexes are abolished—evidence that the lower dorsal cord is affected; (*c*) that there was only a slight degree of cerebral disturbance in some of his cases; and (*d*) that exclusively breast-fed infants are not attacked. These arguments are open to considerable criticism. The frequency of intestinal catarrh, enlarged mesenteric glands, and swelling of the lymphatic tissue of the alimentary tract in necropsies on cases of cerebro-spinal fever might appear to be in favour of the view that the infection may enter through the gastro-intestinal tract. But the prevalence of these changes in animals experimentally infected through the meninges suggests that they are merely the result of the meningococcic infection, however produced (St. Clair Symmers [70]).

Infection from the Blood Stream.

Elser and Huntoon, Austrian, and Herrick,[71] who on the grounds of morbid anatomy, experimental research and clinical observations opposed the view that meningeal infection occurs by direct extension from the naso-pharynx and accessory sinuses, argue that the meningococci pass into the blood stream, and thus reach the meninges, especially the choroid plexuses of the lateral ventricles. In fact, that, as in tuberculous meningitis, there is first a local focus, then a general blood infection, and, lastly, a meningeal metastasis; the main difference being that in cerebro-spinal fever the local reservoir of the meningococci is a saprophytic collection in the naso-pharynx. The sequence of events is exactly parallel to that postulated by Draper and others in acute poliomyelitis—namely, naso-pharyngeal entry, general hæmic infection with later localisation in the central nervous system.

The evidence for infection of the meninges from the general circulation is not, as Horder [74] points out, conclusive. In favour of this view, which is widely gaining ground, is the clinical evidence of a general infection—namely, symptoms resembling those of pneumonia or influenza, before the onset of meningitic manifestations. The pre-meningitic symptoms usually last for a few hours to two days, but may persist much longer (intermittent meningococcic fever), and in some cases of proved meningococcic septicæmia, as in the fulminating and abortive types, meningitis never supervenes. This conception of cerebro-spinal fever recalls the late Dr. Gee's aphorism [73] of nearly a quarter of a century ago that "Pneumonia is not a local, but a general disease; and the brunt of it may fall upon any part—lungs, membranes of the brain, intestines, kidneys."

Herrick recognised the pre-meningitic stage in 45 per cent. of 265 cases, and states that with special technique positive blood cultures can be obtained in 50 to 80 per cent. of cases examined at an early stage. Baeslack [74] obtained positive results in 36 per cent. of early cases, but other observers find that the percentage of blood cultures is not more than 25; and it is assumed that in the ordinary run of cases the blood, though it conveys the meningococcus to the meninges, does not become infected. As an example of the transient nature of the meningococcæmia, attention may be directed to Maxcy's [75] observations of a positive blood culture followed after the short interval of five hours by a negative result.

Huntoon and Elser point out that in meningitis due to extension from ear, mastoid, or antral infection the onset is gradual, whereas in experimental meningitis due to hæmic infection the onset is sudden, so that the acute mode of onset in meningococcic meningitis is in favour of infection by the blood stream. As a further argument in favour of the pre-meningitic septicæmia Herrick instances the success of intravenous injection of serum; and it may be added that the petechial rash seen soon after the onset of general septicæmic symptoms has been found to contain meningococci (Netter,[76] Blanchier [77]).

Some light is thrown on the question why meningitis does not supervene in every case of meningococcæmia, for example, in the abortive, solely purpuric, and the prolonged septicæmic cases, by Austrian's experiments. He found that in rabbits with meningococci injected into the blood meningitis did not supervene unless the congestion of the meninges was induced by the intrathecal injection of horse serum. It may thus be supposed that in cases of cerebro-spinal fever the resistance of the choroid plexuses and meninges is intrinsically low, or that it is diminished by some extraneous factor, or that after a time the meningococcic endotoxin is sufficiently concentrated to damage the meninges and render them permeable to meningococci.

While the hæmic infection of the meninges appears to be applicable to the majority of the cases, the possibility that in certain instances infection may pass by other routes, such as through the cribriform plate of the ethmoid or the sphenoid, should not be entirely excluded. In connexion with the path of infection of the meninges the question arises where the meningitis begins, whether it starts in the choroid plexuses of the lateral ventricles, as seems to be the general view, in the spinal meninges, or in both situations simultaneously. That the meningococci first attack the choroid plexus is supported by the observation that lumbar puncture, when repeated at short intervals, may eventually bring down meningococci by drainage, and that in some fulminant cases the cerebro-spinal fluid obtained during life is free from meningococci, though after death meningococci are found in the lateral ventricles (W. W. Herrick). On the other hand, if the meningitis always spread downwards from the brain to the cord it would be natural to expect that rigidity and retraction of the neck would constantly precede Kernig's sign, that is, if the view that this sign is due to irritation of the posterior nerve roots and not to increased intraventricular

pressure be correct. In many instances this sequence holds good, but by no means in all. Again, in some instances lumbar puncture first yields turbid fluid and subsequently clear fluid, or the reverse of that regarded as suggesting that the choroid plexuses of the lateral ventricles are involved before the spinal meninges. In some necropsies the appearances are compatible with the view that the cerebral and spinal meninges are attacked simultaneously, and Ormerod[78] considers this more frequent than is ordinarily thought. Probably cerebral infection through the choroid plexuses is the usual though not exclusive site of initial invasion.

MENINGOCOCCIC SEPTICÆMIA.

This condition may present several variations from the short initial invasion of the blood by meningococci, which probably precedes infection of the meninges in most, if not all, of the cases of meningococcic meningitis. Possibly cases of true meningococcic septicæmia are only more commonly recognised now than formerly, but Netter[79] has suggested that Dopter's observation that whereas before the war 96 per cent. of the cases of meningococcic meningitis were infected with the meningococcic Type A (Gordon's I. and III. types), a change has taken place, so that now the parameningococcus, or Type B (Gordon's II. and IV.) is responsible for an equal, if not a larger, number of the cases, may be correlated with an increased incidence of meningococcæmia and meningococcic manifestations in the skin, joints, and eyes. Brulé[80] also considers that parameningococcæmia (due to Type B) is more frequent and more severe than meningococcæmia (due to Type A).

Meningococcæmia appears to have been first established by Gwyn[81] in 1899 in a case of meningitis with arthritis. Salomon[82] in 1902 detected meningococci in the blood eight weeks before meningitis supervened; in the following year Warfield and Walker[83] described the first case of meningococcic endocarditis with septicæmia; a fulminating case of meningococcæmia also without meningitis was recorded by Andrewes[84] in 1906, and in reviewing the cases two years later Duval[85] summed up in favour of the septicæmia being secondary to the meningitis, the reverse of the present opinion. Lüdke[86] described a case of meningococcic septicæmia in which in addition streptococci were obtained by blood culture.

Portret[87] distinguished four kinds of meningococcæmia: (I.) without meningitis, (II.) preceding meningitis, (III.) with metastases, (IV.) without metastases. The following forms of meningococcic septicæmia may be described:—

1. In a certain number of cases a *fulminating meningococcæmia* proves fatal before any meningitis has had time to occur, and lumbar puncture, if performed, gives exit to clear fluid without any meningococci or increased cell content. At the necropsy meningococci can perhaps be obtained from the fluid in the lateral ventricles of the brain, but there is no exudation. The clinical features of these cases are severe toxæmia often at the onset with a low temperature followed by fever and perhaps hyperpyrexia, rapid pulse and respirations, and extensive hæmorrhages into the skin, mucous and serous membranes, and adrenals. The clinical picture may suggest the "acute abdomen" such as internal strangulation, intussusception (Pybus[88]) or Henoch's purpura, fulminating purpura, hæmorrhagic fevers.

2. Abortive cases in which a blood infection is overcome after a short time by natural immunity, though commonly assumed to be frequent, are difficult to prove. Cases of febrile meningococcic purpura without meningeal symptoms, or presenting meningeal irritation which, as shown by lumbar puncture, is not due to meningitis and may therefore be explained as meningism, come under this heading. Sainton and Maille's[89] case with a measly eruption, synovitis of two joints containing meningococci, and a positive blood culture but no meningitic symptoms, the whole illness lasting about a week, belongs to this group of abortive cases. In order to determine the incidence of these abortive cases during an epidemic[90] Maxcy selected 27 cases with fever, headache, and malaise, but without petechiæ, and made blood cultures which were uniformly negative. Doubt is thus thrown on the assumption of their frequency, but further investigations of this character are desirable.

3. Intermittent meningococcic fever due to septicæmia may (*a*) last for weeks without any meningitic symptoms ever developing, or (*b*) it may follow meningitis, or (*c*) show transient meningitic symptoms, or (*d*) terminate in meningitis.

(*a*) Some cases have septicæmia for weeks or months and meningitis never occurs. In Liebermeister's[91] case the disease lasted four months and in Bray's[92] case, complicated by chronic pulmonary tuberculosis, there was fever for five months and recognised meningococcæmia for three months. Though striking, they have not been very often recognised: Netter[93] had five examples among his 368 cases, and Brette[94] collected 22 cases in 1918. The attacks of fever may be quotidian or tertian and in the intervals the patient may feel well. The disease may resemble malaria, quotidian or tertian, or enteric fever—Netter's[95] pseudo-malarial and pseudo-typhoid forms. The attacks of fever may begin with a rigor and end with sweating, be accompanied by splenic enlargement; joint pains and orchitis may occur, and rashes, such as polymorphic erythema or erythema nodosum, herpes or papules, especially on the lower extremities or around the joints, or petechiæ may be present. But the disease may run its course without any cutaneous manifestations (Zeissler and Reidel,[96] Worster-Drought and Kennedy[97]). In exceptional instances malignant endocarditis is due to infection with the meningococcus (Warfield and Walker, Cecil and Soper,[98] Worster-Drought and Kennedy.)

(*b*) In another group septicæmia follows the subsidence of meningococcic meningitis. Brulé[99] records a case with septicæmia of two months' duration with purpura and positive blood cultures on five occasions. Lancelin's[100] patient had meningococcic meningitis, and after an afebrile period of four days had fever imitating malaria for seven days and then yielded to serum; meningococci were not obtained from the blood, but the presence of purpura rendered septicæmia highly probable. Among 126 cases Landry and Hamley[101] detected two cases of post-meningitic septicæmia. If blood cultures were more often done in chronic cases septicæmia would probably be shown to be comparatively common.

(*c*) During the course of intermittent meningococcic fever there may be transient meningitic symptoms; thus, Maxcy describes a case with transient rigidity of the neck, which appeared a week after the onset and rapidly passed off.

(*d*) In an allied group of cases the septicæmia is prolonged, but is eventually followed by meningeal infection; in Ainé and Chéné's[102] case the pseudo-malarial stage with splenic enlargement lasted for four weeks before the onset of meningitis; and in Serr and Brette's[103] two cases lumbar puncture was first performed after four and two months' fever, and cures rapidly followed the intravenous injection of serum.

A correct diagnosis is seldom made in the absence of meningitic symptoms. Blood cultures should be taken during the febrile paroxysm.

In Cantieri's[104] case the first meningitic symptoms appeared on the eighty-first day of the disease, and by this time the following diagnoses had been made: intermittent fever, Addison's disease, tuberculosis, Mediterranean fever, septicæmia, and syphilitic fever.

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SUMMER SCHOOL OF CIVICS AND EUGENICS.—The committee of the Summer School of Civics and Eugenics has arranged to hold its second school at Cambridge during the first two weeks of August in the University Arts School. The first week will be devoted to a preparatory course dealing with the scientific bases of educational and social work, and the lectures of the second week will deal with special applications of civics and eugenics to the work of the teacher and social worker respectively. Advanced courses for selected students in biology, philosophy and theory of citizenship, and practical psychology, will be held if sufficient students apply. The National Council for Combating Venereal Disease will organise a Speakers' Course, and a similar course in citizenship will be included. The Regional Association will organise a survey of Cambridge during the fortnight, and a Eugenic and Civic Exhibition will be under the direction of Mr. Harold Peake. Further particulars may be obtained from the Secretary, Summer School of Civics and Eugenics, 11, Lincoln's Inn Fields, London, W.C. 2.

THE CAUSATION AND PREVENTION OF INDUSTRIAL ACCIDENTS.[1]

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EVERY year in this country over 1000 workers (exclusive of miners) are killed in industrial accidents, 100,000 to 200,000 suffer injuries sufficient to incapacitate them for a week or more, and about 2,000 000 suffer minor injuries.

Investigation of Accidents at Munition Factories.

Information as to the causation of accidents was obtained by examining the accident records in four large munition factories over periods of 9 to 25½ months, and over 50 000 accidents were tabulated.[2] At a fuse factory employing 9000 workers the accidents were tabulated for a three-month period in 1915, when the hours of work were usually 12 a day and 75 a week, and for the subsequent two years, when they were 10 a day and 64½ to 54½ a week. Three-fourths of the accidents were cuts, chiefly of the hands against the sharp lathe tools and drills. The number of cuts incurred was at a minimum in the first hour of the morning spell of work, and increased steadily throughout the morning. Such an increase has been observed in other industries, and has generally been attributed chiefly to fatigue. This view appears to be erroneous, at any rate as regards the men, for when they were working the 12-hour day their accidents were no more numerous than when they were working the 10-hour day, and they did not increase more rapidly during the course of the morning spell. In the women, on the other hand, the accidents showed a five-fold increase in the morning spell of the 12-hour-day period, as against a threefold increase in the 10-hour-day period. In the afternoon spell the accidents were 29 per cent. more numerous than in the morning spell, and they were more than twice as numerous in the 12-hour-day period as in the 10-hour-day period. Even after allowing for the longer hours worked, the accidents were two and a half times more numerous in the 12-hour-day than in the 10-hour-day, and this excess must have been due entirely to fatigue. Moreover, in the 12-hour-day period the women were treated for faintness nine times more frequently than the men, and were given sal-volatile (chiefly as a restorative) 23 times more frequently, whereas in the 10-hour day period they were treated for faintness and were given sal-volatile only three times more frequently than the men in each case.

Speed of Production: Carelessness.

The rise of accidents in the morning spell of work is due partly to increasing speed of production. It was found that the output of the workers at the fuse factory increased gradually during the course of the morning spell as the accidents did, and after starting high at the beginning of the afternoon spell it fell away, again in fair correspondence to the accident incidence. However, the variations of output were very much smaller than that of accidents, but this is only to be expected, as a small improvement of output, implying as it did a relatively greater quickening in the manipulation of the lathe and other tools, meant a much greater liability to accidents.

More important than speed of production is the effect of carelessness and inattention. This is shown by the night-shift accidents, which are at a maximum when the workers first come on and steadily dwindle down, till at about 4 A.M. they are not much more than half their original number. From this point onwards they keep steady or show a slight rise—that is to say, the incidence of the night-shift accidents is almost the reverse of that observed in the day shift. The reason appears to be that the night-shift workers get up about four hours before work, and they occupy this time in housework, shopping, and amusements, and in having substantial meals. Hence they often come on to work in an excited state, but they calm down during the course of the night as they have nothing but breakfast and bed to look forward to. The day shift, on the other hand, are lethargic and depressed when they come on to work in

[1] Abstract of lecture delivered before the Section of Epidemiology, Royal Society of Medicine, on March 14th, 1919.

[2] See Memo. No. 21 of the "Health of Munition Workers Committee," Cd. 9046.

the morning, but they brighten up gradually as they have some tea after they have done about two hours work, and they look forward to their mid-day dinner break. That is to say, they tend to get more and more inattentive, and their accidents go up correspondingly. This psychical effect tends to be enhanced by the effects of alcohol consumption.

Effect of Alcohol.

The day shift seldom took any alcohol until their day's work was done, as they could not get alcohol at the factory canteen. The night shift, on the other hand, if they took alcohol at all, did so shortly before coming on to work. Hence any effect of alcohol on accident causation would be greatest during the first part of the night shift and least during the last part. In correspondence with this conclusion it was found that the men (who are well known to drink considerably more than women) showed a greater excess of accidents in the first spell of work, as compared with those in the subsequent spells, than the women did. Again, it was found that during 1916 and 1917, when the average sobriety of the nation greatly increased because of the increasing restrictions on the sale of alcoholic liquids, both men and women showed a steady diminution in this excess of accidents incurred during their first spell of night-shift work. In three consecutive six to eight month periods the relative number of accidents in the first spell of work, when compared with those in the last spell taken as 1·0, varied as 1·9, 1·5, and 1·4 respectively in the men, and as 1·6, 1·4, and 1·3 in the women.

In the day shift there was no evidence of any alcohol effect except when the 12-hour day was in operation. The workers did not stop work till 8.30 P.M., except on Saturdays, so they had but little opportunity for drinking except at week-ends. In correspondence with this fact, the accidents were found to be at a maximum on Monday, and they steadily fell during the course of the week till on Friday they were 32 per cent. less numerous in the men and 27 per cent. less numerous in the women. Then on Saturday they shot up to a fresh maximum. In the 10-hour-day period, however, the workers stopped at 6 o'clock every evening, and they appeared to take their alcohol in more regular and moderate quantities, as their accidents showed no week-end excess. They were, in fact, rather more numerous in the middle of the week.

Temperature and Illumination.

Unsuitable temperature is a very important cause of accidents. The temperature of the fuse factory was registered continuously for six months by means of a thermograph, and it was found that accidents were at a minimum at temperatures of 60°–69° F. At 72° they were 21 per cent. more numerous than at 67°, and at 77° 30 per cent. more numerous. At 57°, again, they were 18 per cent. more numerous. In a not very efficiently warmed shell factory the accidents to women were 2½ times more numerous on such days as the *external* temperature was at or below freezing-point than when it was 48° or over, whilst at intermediate temperatures the accidents were intermediate in number. The accidents to men were similarly affected, and were twice as numerous on the very cold days as on the warm ones.

Defective artificial illumination is well known as a cause of accidents, but the factories investigated were all fairly well lit. Only one class of accidents was found to increase much by night—viz., foreign bodies (as metal or emery) in the eye. Apparently the workers tend to bend more over their work when the lighting is artificial, and it was found that, though accidents in general were 16 per cent. less numerous by night than by day, eye accidents were 30 to 60 per cent. *more* numerous in the worst lit factory. At the best lit factory they showed very little excess.

Accident Prevention.

Accidents can be largely prevented, not only by improving lighting and keeping the factories at a suitable temperature, but by the methods employed in the "safety campaign," which has been adopted with such enthusiasm in the United States. This consists in the installation of safety devices and of as complete a system of mechanical safeguards as possible. Over 20 museums of safety appliances have been set up in various countries, and one is in course of erection in London. Committees of Safety are formed at the factories, on which both employers and employed are represented. These committees investigate safety devices and their installation, inquire into accidents and means for their prevention, and they post information concerning accidents—often of a striking pictorial character—on bulletin boards placed at the entrance of the workshops. By adopting these methods certain well-known companies have reduced their accidents by as much as 78 and 88 per cent., and in this country the accidents at Port Sunlight, where safety methods were introduced in 1917, were reduced to 43 per cent. of those experienced in 1916.

LEFT SCAPULAR PAIN AND TENDERNESS IN HEART DISEASE AND DISTRESS.

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WHILE taking the medical histories of soldiers sent to a heart section complaining of pain below the left breast I noted that some of them also spoke of pain in the back. The repetition of this complaint of pain going through to the back or under the left shoulder-blade became so noticeable that I decided to make some simple observations upon it.

Method of Examination.

From a certain date every patient who complained of pain in the left side of the chest was placed in a consecutive series until it numbered 100. Each man was told to indicate with his forefinger the chief site and then to draw it along or round the region in which pain was felt. In a few cases he would include in his demonstration the lower end of the left scapula; if not, he was told to turn about, and the question was put, "Any pain in the back; and, if so, where?" If he then pointed to the lower end of the scapula he was considered *positive* in respect of this symptom. Otherwise he was negative, and naturally no leading question was put concerning that region. The number of positive cases proved to be 28, and the full notes on these, together with an additional 22 collected later, provide notes on 50 cases which form a basis for this communication.

The history of rheumatic fever was only accepted when the number of weeks in bed, swelling of the joints, or other features confirmed it. Blood pressure was estimated by the auscultatory method, using the Army dial sphygmomanometer. The diastolic pressure was read when, in gradually releasing the air, the loud murmur changed to one scarcely audible. The pulse-rate was counted when the patient had been recumbent three minutes; if it was 100 or more per minute at repeated examinations, tachycardia was held to be present.

Hyperalgesia was investigated as follows. The man lay down stripped to the waist. Without any remark the point of a pin was drawn over the skin from the right axilla across the front of the chest to the left. The presence of a hyperalgesic area was proved by the patient's reactions; he often winced, expressed pain in a movement of the mouth, or volunteered that it felt sore at that spot. If not, the pin was drawn across other intercostal levels from left to right, and he was asked, "The same on the two sides?" When the presence of hyperalgesia was discovered, its extent was determined in detail by the above method. Subsequently the sensitiveness to the touch of cotton wool and to firm pressure with the finger was tested. Similar methods were applied in the investigation of the posterior surface of the chest and the inner side of the arms, always comparing the right with the left. The results were charted on large scale diagrams in relation to the nipple, the intercostal spaces, and prominent bony points.

The Symptom—Left Scapular Pain.

In a consecutive series of 100 patients complaining of pain on the left side of the chest, 28 complained also of pain in the left scapular region. The proportion will clearly vary according to the severity and nature of the cases seen; it is not so high as this figure indicates, unless the pain in front is chronic and moderately severe.

Site.—The patient complains of pain "in the heart" and "going through to the back," or pain at the heart and "under the shoulder-blade." When asked to turn round

and show the place where he feels this pain he typically places the thumb of the left hand at a spot just below or internal to the lower angle of the left scapula. (See figure.) In a few cases he adopts this method of indicating the site before he is requested to localise it. Occasionally it is felt along the vertebral border of the lower half of the scapula, and a more frequent variation is the combination of pain at the lower angle with pain at the same level in the posterior axillary line.

In any case, the scapular pain does not seem to occur in the absence of submammary pain. This accompanying pain in front was situated in one or more of the fourth, fifth, and sixth intercostal spaces in 49 of the 50 cases investigated. In the single exception it was limited to the third space. Ten of the 49 with pain in the lower spaces also felt it in the third, and three of these also in the second. There were eight men in the series who complained of pain or paræsthesia in the left arm, as well as in the left side of the chest, front and back.

Characters.—The pain may be sharp and stabbing, or it may be dull and aching; usually it partakes of the same characters as the accompanying submammary pain, although it is rarely so severe. Some patients talk of a stabbing pain going *through* to the back, and some of an aching pain going *round* to the back. Three complained of the pain at the scapula before they mentioned that in front. Of the rest, one-third described it voluntarily after the pain in front, and two-thirds pointed it out only when the question was put, "Any pain in the back; and where?"

Typical posture in complaint of left scapular pain.

Exertion is by far the commonest exciting cause. The pain in front and at the back was said to be worse on exertion, or present only on exertion, in 45 of the 50 cases. Six also said that it was troublesome at night whenever they lay on the left side or turned over in bed. Three spoke of excitement as an occasional cause. A few were reminded of it when they took a very deep inspiration.

Duration.—The onset of scapular pain is gradual, and the course chronic; in no case was a history obtained pointing to a sudden onset. In a few patients it began at the same time as the submammary, but in most it had been gradually superadded after the lapse of some months or years. The duration of the submammary pain had been longer than five years in 24 cases, between one and five years in 18, and below one year in 8 only.

Accompanying symptoms.—The most constant symptom associated with the thoracic pain is shortness of breath, also dependent on exertion; and it was present in all but two cases. In most it preceded the onset of pain, otherwise it became noticeable about the same time. Other frequent symptoms were palpitation, dizziness, and general weakness.

The Sign—Left Scapular Hyperalgesia.

It is well known that the pain of heart affections may be accompanied by hyperalgesic areas of the chest, but it is often forgotten that this hyperalgesia is to be found on the *posterior* surface of the chest as well as on the anterior.

The patient himself not infrequently claims that he is sore about the left breast, and says that he cannot bear the pressure of his braces or equipment on that side. Such a man will wince when the apex beat is palpated or examined with the stethoscope, especially (for obvious reasons) when the monaural variety is used. Though it is rare for him to complain of soreness at the back, yet when it is examined he will recognise the pin as sharper and more constantly the finger pressure as painful. The region most commonly affected is that adjoining the lower angle of the left scapula. If the extent is small it is often limited to that site, and when it is large this region is almost invariably included and often proves to be more sensitive than the rest.

It has been stated that in a series of 100 consecutive patients complaining of pain on the left side of the chest in front, 28 also complained of pain in the left scapular region. Of these 28, 10 showed hyperalgesia on the posterior surface of the chest, involving in every case the lower part of the scapula, though sometimes extending far beyond it. The accompanying table shows the extent of the hyperalgesia in this restricted number of cases, quoted because they complained of scapular pain and occurred in a consecutive series. The subject of hyperalgesia in cardiac disease generally lies beyond the scope of this paper. It may be mentioned that it often persists week after week. Thus each of the ten cases tabulated proved to have areas almost exactly the same when they were re-examined at the end of a fortnight.

Extent of Hyperalgesia in Ten Cases with Left Scapular Pain.

Anterior.	*Posterior.*
1. II. space to L. costal margin.	1. Spine of scapula to IX. space.
2. I. space to umbilical plane.	2. Spine of scapula to loin.
3. Nil.	3. Lower angle of scapula (to finger pressure only).
4. IV. and V. spaces.	4. Lower angle of scapula (finger pressure only).
5. I. space to umb. plane.	5. Spine of scapula to loin.
6. III. to V. spaces.	6. Region of angle of scapula.
7. II. to VI. spaces.	7. Spine of scapula to IX. space.
8. IV. space to below umb. plane.	8. Spine of scapula to loin.
9. V. space.	9. Lower angle of scapula.
10. III. to VI. spaces.	10. Lower half of scapula.

Causes of Left Scapular Pain and Hyperalgesia.

It is a mixed group of disease and disorders that we are considering, assembled only by the common possession of chronic pain on the left side of the chest, back and front. So it is evident that the diagnosis will often be incomplete and often impossible, and some of the illustrative cases (*q.v.*) appended will indicate how great is this difficulty.

Whatever is capable of producing chronic pain below the left breast appears to be also capable of producing pain at or about the lower angle of the left scapula. It is therefore seen in valvular disease of the heart, myocardial disease, and in arterio-sclerosis and chronic nephritis where the heart has become burdened. It occurs in functional heart disease if that term is used widely to embrace cases with cardiac symptoms and without abnormal physical signs connoting organic disease. Among such would be included those presenting tachycardia only, and those with added symptoms or signs indicative of functional nervous disorder in association. Then there are patients with general ill-health or debility, with no signs indicating which system is at fault or which combination, but in whom the clear story of breathlessness and præcordial pain on exertion suggests that at least the heart is not acting efficiently. It will be seen that mention has been made in this paragraph of some conditions which are provisionally included under the term "soldier's heart."

The history of *rheumatic fever* was conspicuous, for it was given in 20 out of the 50 cases. Of these, 10 proved to have signs of valvular disease, but the other 10 were found among the remaining 40 non-valvular cases. Only 2 men gave a history of syphilis. Two dated their pain from scarlet fever, 2 from pneumonia, and 2 from trench fever; none, it may be noted, ascribed the onset to pleurisy.

The general diagnoses or (in default) the abnormal signs noted among the 50 cases with scapular pain were as follows. Ten had rheumatic valvular disease of the heart—namely, 6 aortic incompetence, 2 mitral stenosis, and 2 mitral incompetence. One patient had breathlessness and pain in the chest and left arm so severe that the diagnosis of myocardial disease was made. Six had a high systolic blood pressure, over 150 mm. Hg at repeated examinations, and one of these showed enlargement of the heart with a blood pressure of 210; another had very thick and tortuous arteries and his blood gave a positive Wassermann reaction. In eight cases there was tachycardia, the pulse-rate in recumbency being 100 or more at repeated examinations. Four men were nervous in their manner, two of these were tremulous, and a third had a typical hysterical seizure under subsequent observation. One man had persistent slight

albuminuria with a normal blood pressure. The cases just enumerated formed about half those in the series (50); in the remainder no abnormal physical signs could be found.

Remarks.

The pain and hyperalgesia around the lower angle of the left scapula, here described in association with submammary pain and hyperalgesia, arise from the heart. Even where the physical signs of heart disease are absent, the rheumatic history, the relation to exertion, and the accompanying shortness of breath indicate at least some physical impairment or functional disorder of the heart. Those cases which in addition show an extension down the left arm provide supporting evidence.

In examining a patient suspected of pulmonary disease there is admittedly a tendency to look upon the chest as a box with a back and a front and to pay little attention to the sides as presented by the axillary surfaces. Similarly, there is a temptation in cardiac examination to be satisfied with the symptoms and signs of the anterior surface of the chest, on which is envisaged the underlying heart. Moreover, the patient himself, knowing that his heart is under consideration, will incline to emphasise his sensations in that region rather than in one remote from it. Were it not for these two reasons it would be surprising that more attention had not been drawn to left scapular pain and the local hyperalgesia which may accompany it.

This localisation of pain and hyperalgesia can only be interpreted on the basis of referred pain in visceral disease. In the fundamental communications of Sir James Mackenzie and Dr. Henry Head the hyperalgesic areas on the back of the chest as well as the front are described, and the latter quotes cases, in illustrating the sixth thoracic segmental area, where pain and hyperalgesia at the lower angle of the left scapula accompanied that in front.

The subject of pain and hyperalgesia in heart disease generally is beyond the scope of this paper. But it may be that our ideas upon it have been influenced too much by the study of angina pectoris, where frequently the presence of aortic disease, usually syphilitic, introduces a complicating factor which is apt to mislead. With the paroxysmal pain of angina pectoris the hyperalgesia is often evanescent, and the segments involved are the lower cervical and upper two or three thoracic; hence the characteristic extension to the left arm. But in the cases of chronic heart disease and disorder which we are considering the hyperalgesia may be present week after week, and the segments involved are at a lower level of the spinal cord. The pain is less severe but more constantly present, and it is far more commonly situated in the submammary (and infrascapular) region than anywhere else. These regions lie largely within the distribution of the sixth thoracic spinal segment (Head), alone or in combination with the fifth. The hyperalgesia, when present, generally includes this segment, but it may spread to many others adjoining, and thus occasionally even to the upper segments and so the left arm.

When the skin and subcutaneous tissues and muscles of the chest wall have become hypersensitive as a result of chronic heart disease or disorder, and if this hypersensitiveness persists or frequently recurs the patient has entered into a new and more obstinate stage of his malady. Hyperalgesia is not merely the accompaniment of chronic pain of cardiac origin, it induces and supplements it. For apart from the pain still arising from the heart, the patient now possesses a zone of tissue which is itself an immediate cause of pain whenever it is stretched or pressed upon. The movements inseparable from manual work or marching and the pressure of equipment in soldiers will readily provoke pain by their physical disturbance of the morbidly sensitive tissues. Indeed, slight movement or pressure—for instance, turning over in bed or lying upon the left side or a deep inspiration, will cause pain which otherwise would not be considered characteristic of pain of cardiac origin.

Conclusions.

1. Pain at the lower angle of the left scapula often supervenes in the course of chronic pain below the left breast, especially when this is severe and long standing.

2. The causes of left submammary, as also of left scapular pain, include valvular and myocardial disease, arterial and renal disease, especially with high blood-pressure, functional heart disorders with or without nervous symptoms, and general ill-health where the symptoms suggest cardiac distress. It is therefore present in many cases of "soldier's heart."

3. The sixth thoracic spinal segment, alone or in combination with the fifth, supplies the submammary and infrascapular regions where *pain* is commonly felt in these heart affections. The accompanying *hyperalgesia* may be limited to the distribution of the sixth, or fifth and sixth segments, but it often extends to a larger area and occasionally even to that representing most of the segments of the thoracic cord.

4. This submammary pain and hyperalgesia of chronic heart affections with extension to the left scapula forms a contrast in many respects with the sternal and supramammary paroxysmal pain of angina pectoris with extension to the left arm.

5. If hyperalgesia persists or recurs frequently in the course of chronic heart disease or disorder, it indicates a new and troublesome phase. Hypersensitive tissues are not merely concomitant, they induce and supplement pain. It is now provoked even by slight pressure or tension, such as by lying on the left side or turning over in bed or by taking a deep breath, which otherwise would not produce characteristic cardiac pain.

Illustrative Cases.

CASE 1. *Mitral stenosis; left submammary and left scapular pain and hyperalgesia.*—Patient, aged 36, France one year. *History.*—Age 19, rheumatic fever, bed six weeks, knees and wrists swollen. Since then for 17 years had suffered from aching pain in the fourth and fifth left intercostal spaces about the nipple line, and "the pain goes through and catches me just under the shoulder-blade," pointing to the lower angle of the left scapula. On exertion the aching became more severe and he felt "no strength in the left side." The only other complaint, of equally long standing, was shortness of breath; he had "to stop to get breath when walking uphill."

Examination.—Fair physique. Apex beat fourth (? fifth) left space in the nipple line. At the apex, short presystolic murmur, slight accentuation of the first sound, and duplication of the second. Pulse-rate 96 standing, 80 after lying three minutes. Arteries not thickened. Blood pressure 135 mm. Hg systolic, 95 mm. Hg diastolic. Urine, no albumin. Radioscopy showed the left border of the heart reaching the nipple line, and some enlargement of the heart to the right of the sternum.

Hyperalgesia.—At the first examination he winced when the apex beat was palpated, and said, "It's sore there." The fourth and fifth left spaces from the lateral sternal line to the anterior axillary line were sore to dragged pin point and to finger pressure. Cotton-wool was "felt more" in this area. At the back finger pressure about the lower angle of the left scapula made him wince; no other area was tender, and to pin and cotton-wool there was no hyperalgesia posteriorly.

CASE 2. *Aortic incompetence (rheumatic); left submammary and left scapular pain; extensive thoracic hyperalgesia, anterior and posterior.*—Patient aged 20. France two years. *History.*—Age 17, rheumatic fever, bed eight weeks, knees and ankles swollen. Since then for three years had complained of pain in the fourth and fifth left spaces in front and at the lower angle of the left scapula behind. It was aching at night and sharp on walking. Apart from the pain, he mentioned that he got "sore every time anyone touches me about here," pointing below the left breast. He had also been troubled with shortness of breath during the same period, for instance, he panted when he tried to run. A minor complaint was dizziness on exertion.

Examination.—Forcible apex beat in the fifth space in the nipple line. Short faint diastolic murmur along the left border of the sternum. The pulse-rate, lying, was 60. The radial arteries were thickened. The systolic blood pressure was 170, the diastolic 110. Urine, no albumin. Radioscopy showed slight enlargement and increased convexity of the left border of the heart.

Hyperalgesia.—On palpating the apex beat at the first examination the patient said it was tender there. The large area of hyperalgesia extended from the second rib to the left costal margin, and laterally from the left border of the sternum to the axilla, where the limits, as usual, were ill-defined. At the back the area extended from the spine of the left scapula to the tenth left rib. Within these limits cotton-wool was "felt more," and steady pressure with the finger provoked signs of pain. He winced most of all when the finger was applied firmly below the lower angle of the left scapula, and said that this was the sorest place behind. Ten days later examination showed the same areas equally hyperalgesic.

CASE 3. *"Soldier's heart"; rheumatic history; submammary and left scapular pain and hyperalgesia; left brachial paræsthesia.*—Patient aged 41. France one year. *History.*—

Age 37, rheumatic fever, bed three weeks, knees swollen, "couldn't move." Since then for four years had suffered from pain in the fifth left space in the nipple line, going round to the lower angle of the left scapula where it was often as severe as in front. Slight pain was constantly present, but at work it became severe and after a few minutes a "deadly feeling" would come into the left arm; it felt numb and weak though not painful. The severe pain in the chest would last about 20 minutes and then gradually diminish within an hour. For a month he had noticed that the left breast was sore. The only other complaints were of breathlessness and dizziness on exertion, symptoms also present for four years.

Examination.—Stolid farm labourer of good physique. Slight objective dyspnœa on walking into the room. Apex beat just palpable, fifth space in the nipple line. Heart sounds normal; no murmurs. Radial arteries thickened. Pulse-rate on standing 130, and at subsequent examinations generally higher than normal. Blood pressure, systolic 145, diastolic 95. Urine, no albumin. Radioscopy showed nothing abnormal in heart or aorta. Wassermann blood test negative.

Hyperalgesia.—Wincing on ordinary examination with stethoscope. By dragged pin an area was found extending in the third, fourth, and fifth left spaces from the nipple line to the anterior axillary line, where it became ill-defined. In this area the pin "scratched more," cotton-wool "tickled more," and pressure with the finger made him wince. A similar area about 2 inches in diameter was found at the lower angle of the left scapula, and was as sensitive to pin or pressure as the area in front. There were a few scattered points of tenderness to pin on the axillary skin joining these two areas. Examinations made 2, 4, and 18 days after the first showed persistence of the areas described.

CASE 4. *"Soldier's heart"; immaturity; rheumatic history; left scapular and submammary pain; extensive thoracic hyperalgesia.*—Patient aged 18. France one month. *History.*—Age 7, rheumatic fever, bed seven weeks, "couldn't use legs." Since enlistment seven months ago had never been capable of drill or marching on account of shortness of breath and a feeling of "strain" on the left side of the chest. For three months he had suffered from aching pain at the lower end of the left scapula and below it, and this was his *first* complaint when I saw him. The pain was also present in the third, fourth, and fifth left spaces in front, and he felt sore there. No history of pleurisy, pneumonia, or any other illness, except rheumatic fever, was obtained.

Examination.—Immature, otherwise fair physique. Apex beat fifth space, internal to the nipple line. Heart sounds normal; no murmurs. Pulse-rate, lying, 72. Arteries not thickened. Blood pressure, systolic 130, diastolic 90. Urine, no albumin.

Hyperalgesia.—The area extended from the first left intercostal space over almost the whole of the left side of the chest down to below the left costal margin where its lower limits became indefinite. Mesially this area extended almost to the left lateral border of the sternum, and was continuous in the axilla with the posterior area. This posterior area extended from the spine of the left scapula above, over the whole of the lower ribs of that side, and ended below at an ill-defined line across the left loin. In this large area, comprising almost the whole of the left side of the chest, the pin point felt sharper, cotton-wool was "plainer," and the finger pressure produced pain. The tissues mesial to and just below the lower angle of the left scapula were more sensitive to finger pressure than anywhere else. The arms were free. No further examination was made with regard to the hyperalgesia until four weeks had elapsed; then it was repeated without reference to the previous findings. The second diagram was similar, and included the whole of the above area, but extended rather higher behind and reached the level of the left iliac spine below, both in front and behind.

CASE 5. *"Soldier's heart"; tachycardia; left submammary and scapular pain and hyperalgesia; slight brachial pain.*—Patient aged 24. France four years. *History.*—For about six years he had suffered from aching pain situated between the third and sixth left spaces in the nipple line, and going round to the back to the lower angle of the left scapula. On inquiry about both arms he said that sometimes there was slight pain in the left arm to the elbow. The thoracic pain was almost constant and became so sharp on exertion that he could not even groom a horse. Other complaints were dizziness and shortness of breath on exertion. Seven years before he was five weeks in bed with scarlet fever. There was no history of rheumatic fever, trench fever, P.U.O., or of any other illness.

Examination.—Good physique. No signs of nervousness. Apex beat fifth space, internal to the nipple line. Heart sounds normal; no murmurs. Pulse frequent at each examination, e.g., 128 standing, 100 lying. Blood pressure, systolic 130, diastolic 60.

Hyperalgesia.—In front, fourth, fifth, and sixth spaces to pin, wool, and finger; second and third to finger pressure only. Behind, from lower third of left scapula to tenth left space tenderness to pin, wincing to finger pressure, and cotton-wool felt more.

CASE 6. *Arterio-sclerosis; high blood pressure; enlarged heart; left submammary and left scapular pain and hyperalgesia.*—Patient aged 35. France two years. *History.*—For about nine months pain in the fifth left space internal to the nipple line and "it goes through to the back," indicating with the thumb the lower angle of the left scapula. The pain was said to be burning and it occurred at any time. He also complained of shortness of breath and of general weakness. No history of acute rheumatism or of any other serious illness.

Examination.—Fair physique. Apex beat sixth space, external to the nipple line, forcible. Heart sounds normal. No aortic diastolic murmur. Arteries very thick and tortuous. Pulse-rate, standing, 128; lying, 112. Urine trace of albumin at one examination, no albumin and no casts at the other. Blood pressure 230 (!) systolic, 150 diastolic; the following day in bed, 190 and 110 respectively.

Hyperalgesia.—On ordinary palpation in the region of the apex beat he winced. To pin and cotton-wool no area of hyperalgesia could be found either at the first examination or ten days later. Yet on both occasions the fifth and sixth spaces in front and the tissues all round the lower angle of the left scapula behind were very sensitive to finger pressure, which made him wince.

REPORT UPON THE

AUTUMN INFLUENZA EPIDEMIC (1918)

AS IT AFFECTED THE N.Z.E.F. IN THE UNITED KINGDOM.

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RECENTLY the present writers [1] described the sequence of events in January and February, 1918, which led to the prophylactic inoculation in March of some New Zealand contingents in the United Kingdom with M.C.V. (mixed catarrhal vaccine) in an attempt to immunise them against *B. influenzæ* and its possibly fatal complications, and against other catarrhal organisms. The immediate effects upon a nominal roll of 1000 inoculated individuals were summarised, and reference was made to the resistance exhibited by these same men towards the June primary wave of "influenza" which swept over England. The original nominal roll of 1000 was not observed after the date of our previous communication, but further investigation enables us to present a tabular statement (Table I.) of the effect of the severe

TABLE I.

—	Inoculated.	Uninoculated.
Average total strength N.Z. troops in U.K., 21,759	Approx. 16,104	Approx. 5700
Incidence of influenza (3366 cases) ...	1·3%	4·1%
Mortality in all cases	0·26%	2·2%
Mortality in severe and complicated cases	8·0%	23·0%

second or autumnal wave of influenza upon a large body of inoculated and uninoculated N.Z. troops in England. We now propose to consider the data from which this statement is prepared in some detail.

Early in September, 1918, the New Zealand Medical Headquarters directed that further supplies of mixed catarrhal vaccine should be prepared in order to provide prophylactic vaccination for all members of the New Zealand divisions; but as it was found impracticable to carry out this prophylaxis with regard to the bulk of troops on active service in France, the measure was perforce confined to troops and members of staffs of all camps and hospitals (both male and female) in the United Kingdom. We believe

that the authorities were guided in this proceeding by the satisfactory results of the initial experiments in prophylactic vaccination against respiratory infections undertaken during the spring of 1918, when, apart from the 1000 inoculated troops whose subsequent record was particularly followed, some 3000 other troops were inoculated with the mixed catarrhal vaccine at about the same time. The consensus of opinion of senior medical officers and others capable of judging the general immunity from respiratory infections of these troops further strengthened the conclusions inferred from the observations published in the article already referred to.

Consideration of Early Statistics.

In commenting upon our early statistics Emery [2] suggests that the figures given in the table of cases are not sufficiently lucid. We therefore venture to refer to them again. In order to obtain data of the results of these initial inoculations a nominal roll of the first 1000 men inoculated with M.C.V. was made, and detailed records were kept of all respiratory infections occurring among them of sufficient gravity to justify their admission to hospital. It was impossible during active military operations to follow the incidence of minor catarrhal conditions for which men might have paraded sick in camp, but it was considered that a hospital admission record for respiratory infection would give at any rate a criterion of immunity and maintenance of military capacity or otherwise if compared with other uninoculated groups.

The control figures were obtained, not from the record of any one other group of 1000 men, but by the average of all other thousands obtainable; as these comprised 19,000 troops, the control figures illustrate the average hospital admissions for respiratory infections per average 1000 of some 19,000 uninoculated troops. This last statement, however, needs a further qualification, for, as we have stated, some 3,000 other troops were inoculated at or about the same time as the 1000 nominal roll men; further, all subsequent reinforcements were inoculated with M.C.V. on arrival in camp in the United Kingdom. Therefore all or some of those other inoculated men may have been included among the control 19,000; if that is so, it only makes the contrast a little greater, for if we presume that the other odd 3000 troops were as immune as the nominal roll 1000 proved to be (and the general consensus of opinion of medical officers suggests that they were), then the higher proportion of respiratory complaints were really borne in an even greater percentage of the control *uninoculated* troops than is shown in our figures.

The figures to which this reference is made may be re-stated here for the 10 weeks from June 7th to August 18th, which includes the period of the first and less severe influenza epidemic of 1918. During that period (of 10 weeks) 2 cases of respiratory infection occurred in our 1000 inoculated men of sufficient severity to be admitted to hospital, compared with 43·2 cases per average 1000 in the control uninoculated cases, and of these most were due to the prevailing influenza during June and July. This suggested a definite immunity against respiratory infections, including the form of influenza prevalent during the summer months of 1918.

Formula of M.C.V.

During September, 1918, when the provision of a considerable supply of prophylactic catarrhal vaccine was being undertaken, the opportunity of obtaining fresh material from virulent cases of acute respiratory disease occurred; a transport arrived at a port in the United Kingdom, among whose company during the last 10 days of its voyage a very fatal form of septicæmic influenzal pneumonia had broken out. From several of the surviving cases, which were typical of those described by Abrahams, Hallows, and French,[3] as well as from similar cases which, by the courtesy of the Admiralty, were obtained from a naval hospital, fresh strains were obtained of streptococci, pneumococci, *B. influenzæ*, whose virulence had been too well proven, as well as other catarrhal organisms.

Much consideration was given to the question of whether the formula and dosage of our previous M.C.V. 1 and 2 should be altered or adhered to on this occasion of further production. It was, however, decided to adhere to the previous formulas for the following reasons.

1. Because the vaccine appeared to have established satisfactory immunity not only against general catarrhal infections (for which it was primarily designed), but also against the summer influenzal epidemic.

2. Because of the confidence placed in its antigenic potency—a confidence based upon the results of our serological tests, incomplete though they were—as well as the result of the clinical observations of our nominal roll.

3. Because its use had interfered so slightly with the training and movements of troops, which was necessarily a most practical point to keep in mind.

The constitution of the M.C.V. which we employed in prophylaxis was as follows:—

Organism.	1st dose.	2nd dose.	Organism.	1st dose.	2nd dose.
	Millions.			Millions.	
Pneumococcus ...	50	100*	*M. catarrhalis* ...	25	75
Streptococcus ...	10	50	*B. pneumoniæ* ...	50	100
B. influenzæ ...	10	30	*B. septus*	50	100
Staph. aureus ...	200	500			

* Organisms per 0·5 c.cm.

The vaccine was "polyvalent" in respect to each of the contained organisms—that is to say, many strains of each of the cocci and bacilli, selected on account of their typical characters, were used in preparing the bacterial emulsions from which the vaccine was eventually compounded.

The Question of Dosage.

As the dosage of our vaccine has been the subject of adverse criticism in some quarters, we should take this opportunity of stating our conviction, based upon animal experiments as well as clinical observation, that the antigenic value of a vaccine depends primarily upon the *character* of the bacterial protoplasm it contains rather than the amount. One of the present writers maintained many years ago that the ideal organism to use in the preparation of a vaccine was one which was not more than two generations removed from the human body. Under these conditions the attenuation in virulence and alteration in its cytoplasm that an organism undergoes is a negligible quantity, and in our opinion its antigenic value is unimpaired. In the case of such highly parasitic organisms as the influenza bacillus, the pneumococcus, and the *Streptococcus longus* the ideal is difficult of attainment, but by lavish use of media and careful attention to optimum conditions of culture it is possible to isolate pure cultures by the second generation and keep them as mother cultures, so that the vaccine can always be prepared from, at latest, the third generation.

On the other hand, when many generations are passed before the organism is isolated in a state of purity virulence becomes rapidly attenuated and other biological characters altered to such an extent that its antigenic value is considerably impaired. Take, for example, a culture of the pneumococcus ten generations removed from the body. It would be necessary to inject many hundreds of millions of cocci into a laboratory animal to produce an antibody response in any way equivalent to that resulting from the introduction of 5 millions from a second generation culture. On the other hand, it is within our observation that several inoculations of 500 millions of a stock "commercial" gonococcus vaccine have produced no effect whatever upon a man suffering from chronic urethritis, whilst the injection of 5 millions of a "third generation" autogenous vaccine was followed within 48 hours by acute arthritis in both knees and both wrists.

Now in all the organisms entering into the composition of our M.C.V. the second generation has been the "mother" culture from which the cultures actually forming the vaccine have been seeded, and we are satisfied that had we used the large doses advocated by some we should have strained the immunising machinery of the inoculated men to the breaking point, reaped a large crop of "severe reactions," and failed entirely in the attempt to immunise.

Inoculation Returns.

Through the organisation of New Zealand Medical Headquarters, returns as to inoculations given and "reactions" observed were again obtained from all New Zealand units and hospitals in the United Kingdom. These show that inoculations with M.C.V. were commenced during the week ending Oct. 16th, 1918, and proceeded rapidly and unevent-

TABLE II.—INFLUENZA EPIDEMIC—SEPT. 10TH TO DEC. 20TH, 1918.

—	Unit.	Cases of Influenza.	Clinical characteristics.		Severe cases.		General treatment.	Source of infection.
			Simple.	Severe.	% to total.	Deaths.		
A	Gen. Mil. Hosp.	284	Pyrexia 3–6 days. General malaise, headache.	Broncho-pneumonia chiefly, average duration 14 days. Functional aphonia in a few.	4·4	6	Immediate bed. Aspirin, quinine, tonics.	Direct contact.
B	,,	188	Pyrexia 3–4 days; malaise; headache; backache; prostration.	Bronchiolitis, broncho-pneum., toxæmia, streptococcal.	6·0	8	Bed at once. Stimulation; vaccine and serum given as indicated in complicated and toxic cases.	Contact personal.
C	,,	171	Pyrexia.	Severe bronchitis, broncho-pneum., lobar pneum., pleurisy.	8·0	3	...	Contact.*
D	Convales. Depôt.	249	...	Tracheitis, bronchitis, broncho-pneum.	12·8	7	Symptomatic. No specific treatment gave definite results.	Contact.
E	P.U. Discharge Depôt.	94	Pyrexia 4 days.	Hospital 3 weeks.	22·3	1	Sponging, aspirin, calomel, expectorants, antiphlogistine.	Not known.
F	Command Depôt.	85	...	Bronchitis (4), pneumonia (3), purulent bronchitis (2), empyema (1), pleurisy (1), otitis media (1).	26·4	3	Isolation. Gargle, pot. permang. 1/1000 and Levick spray. Nasal spray zn. chlor. 1%. Disinfection of underclothes and handkerchiefs. Pot. iod., creosote.	Contact.
G	Training Camp.	986	Pyrexia 3–4 days. Epistaxis common.	Broncho-pneum. with early cyanosis.	30·0	48	(All severe cases evacuated to nearest military hospital some miles distant.)	Crowding in huts.
H	,,	894	Pyrexia 4 days.	Broncho-pneum.	7·0	13	Bed at once. (All severe cases were transported several miles to nearest military hospital.) Vinum ipecac. and pot. cit.—best results.	Naso-pharyng. infect. (direct contact).
J	,,	86	Mild pyrexia in most cases.	,,	3·5	2	Levick spray and zinc sulph. insufflation in all cases; disinfection of buildings; reduction of numbers in huts and canteens.	Contact.†
K	G.H.Q. & billets.	237	Pyrexia 6–7 days.	Pneumonia.	...	1	Bed at once. Good ventilation. Expectorants. No specific found.	Contact.‡
L	Training Camp.	21	Pyrexia 3–4 days. Persistent cough for a week.	Bronchitis and broncho-pneum.	28·5	1	Immediate bed. Calomel, aspirin, Dover's powder. Expectorants.	Direct contact.
M	,,	5	Pyrexia 7 days.	...	...	0	Aspirin, Dover's pulv., calomel. Expectorants.	,,
N	,,	27	Pyrexia 2–3 days.	Pneumonia.	15·0	0	Rest in bed. Diaphoretics, treatment of symptoms.	Not known.
O	,,	7	...	,,	...	0	Bed, isolation. Gargle parade for all every A.M. Sod. sal.	Contact: civil population.
P	Convales. Hosp.	32	Pyrexia.	...	0	0	...	...

* Probably from case of influenza from transport ship. † With infected camps and neighbouring towns. ‡ Also crowding in billets.

fully (with the exception of two units to be referred to later) up to the week ending Dec. 8th. During this period 19,608 persons received M.C.V. 1, and 16,104 received M.C.V. 2 as well.

The number of "reactions," all of them characterised as "slight," are definitely stated to be 32 (in three units they are not enumerated but stated as being very few), the figures referring not only to troops in camp and to many patients in hospital, but also to male and female staffs of hospitals who, on account of the rush of work at that period, were unable to take the prescribed "24 hours off" after inoculation, but carried on with their duties. The figures obtainable (approximately 3 per 1000), although not absolutely complete, are sufficiently significant to prove that M.C.V. does not incapacitate to an appreciable extent.

Unfortunately, the second and more severe influenza epidemic commenced in certain of the New Zealand units before a satisfactory immunity had opportunity of developing. In one hospital unit (A) it had already begun, and the use of the vaccine as a prophylactic measure was withheld; in camp unit (G) the outbreak immediately followed the first days of giving M.C.V. 1 to some 2260 men; in most other units, however, a longer interval elapsed between the inoculation with M.C.V. and the outbreak of influenza, and the following notes refer to the influenza cases which occurred in all units during the autumn epidemic in bulk and in certain instances in detail.

A circular from New Zealand Medical Headquarters was then addressed to Commanding Officers of hospitals and S.M.O.'s of camps requesting their experiences of the influenza epidemic as it affected their units. From the replies the following data have been accumulated, the summary of which we have been allowed to use in compiling Tables II. and III. by the authority and courtesy of the D.M.S. Much valuable material has in this way been collected, and the independent expressions of opinion by those in charge of cases at the various units will give, we believe, increased interest to these notes.

Influenza Epidemic in Autumn, 1918.

The details in Table II. are arranged to show for each unit concerned (1) the number of cases of influenza treated during the period Sept. 10th to Dec. 20th, 1918; (2) the number of fatal cases; (3) the clinical types and percentage of severe cases; (4) the general treatment adopted by the medical officers in charge; (5) the opinions held as to source of infection.

The epidemic commenced in these various areas between the dates Sept. 10th and Oct. 30th, 1918, but there appears to be no definite relationship between the date of onset (whether earlier or later in the general epidemic period) and the severity or mortality percentage of cases infected (see Table III.).

The units concerned include three general hospitals, seven training camps, all in different areas of the United Kingdom, a command depôt, a convalescent camp, a discharge depôt, and city billets, none of these units being associated with each other except through the necessary interchange of troops. Geographically the areas concerned in these details lie roughly between the limits of Stafford to Brighton in one direction and Grantham in Lincolnshire to Torquay in the other, the larger camps being situated in the Salisbury Plain area.

The types of cases which occurred were similar to those noted by all observers throughout the United Kingdom. (A) *Simple pyrexia* of from two to seven days' duration, accompanied by malaise, prostration, headache, body pains, coryza, and epistaxis in varying degrees. (B) *Severe infection* occurring in 15·5 per cent. of cases, in which bronchitis, bronchiolitis, broncho-pneumonia, pleurisy, &c., in varying degree and combinations supervened upon the previous pyrexia, and, in those cases which became fatal, passed

TABLE III.—INFLUENZA EPIDEMIC—SEPT. 10TH TO DEC. 20TH, 1918.

	1	2	3	4	5	6	7	8 Percentage of deaths to severe cases.		9 Mortality.					10
										Total.		N.Z. troops.			
—	Unit.	Commencement of epidemic.	Prophylactic inoculation with M.C.V.	Approx. average strength of unit.	No. of cases with influenza.	Per cent. of unit affected.	Per cent. of serious cases.	In uninoculated.	In fully inoculated.	In N.Z. troops.	In Home Forces in N.Z. hosp.	In uninoc. persons.	In persons having M.C.V. 1.	In persons having M.C.V. 2.	Opinions of O.C.'s and S.M.O.'s of units concerned as to the effects of M.C.V. inoculation.
A	Gen. Mil. Hosp.	Sept. 10	−	1700	284	16·9	4·4	50%	...	3	3	3	...	0	"Impossible to estimate."
B	"	Oct. 4	+	1880	188	10·0	6·0	70%	0	6	2	6	...	0	"Inoculation appeared to definitely protect from influenza, and in those affected, to lessen the severity of infection."
C	"	" 2	+	?	171	?	8·0	...	...	3 (Same as F)	3	0	...	...	Not stated.
D	Convales. Depôt.	" 24	+	2500	249	9·8	12·8	6%	15%	7	...	...	2	5	"Impossible to make definite statement. All cases which occurred had had 2 injections. Practically all men in camp were inoculated."
E	P.U. Discharge Depôt.	" 20	+	1800	94	5·4	22·3	5%	0	1	...	1	...	0	"Cases inoculated twice were mild. Cases with complications all occurred in those inoculated only once or not inoculated."
F	Command Depôt.	" 17	+	2580	85	3·0	26·4	0	13%	3	...	...	...	3	"Severity of complications decreased as the interval from inoculation increased. I surmise that M.C.V. inoculation has been beneficial."
G	Training Camp.	" 23	±*	2700	986	36·0	30·0	16%	0	48	...	10	38	0	"Epidemic commenced in those who had most recently received M.C.V. No. 1."
H	"	" 30	∓†	4375	894	20·4	7·0	21%	0	13	...	13	...	...	"Inoculation was commenced three weeks after epidemic began, therefore impossible to draw definite conclusions." (No deaths occurred in cases after inoculation was instituted.)
J	"	" 11	+	490	86	17·2	3·5	33%	33%	2	...	1	...	1	"Immunity limited to 3 weeks, but subsequent cases much lighter."
K	G.H.Q. and billets.	" 1	+	2100	237	11·3	?	...	...	1	...	1	...	...	"The one death occurred before inoculation was commenced. All cases since have been mild. These facts would tend to favour the effect of M.C.V. inoculation."
L	Training Camp.	Sept. 10	+	500	21	4·0	28·5	17%	0	1	...	1	...	...	"Since inoculation only one case occurred."
M	"	" 17	+	80	5	6·3	0	...	...	0	...	...	...	...	"Since inoculation no cases of influenza have occurred."
N	"	Oct. 14	+	630	27	4·0	15·0	...	...	0	...	...	...	...	"Appears to have preventive effects. Of men who caught cold after inoculation, very few had any pyrexia."
O	"	" 10	+	140	7	5·0	0	...	...	0	...	...	...	...	"No serious cases occurred in this camp."
P	Convales. Hosp.	" 1	+	?	32	?	0	...	...	0	...	...	...	...	...
	Totals	Sept. 10, 18 to Oct. 30, 18	...	...	3366	...	...	23%	8%	85	8	36	40	9	
										= 93		= 2·2%		=0·26%	

* Commenced and discontinued. † Commenced late in epidemic.

rapidly into a condition of intense toxæmia or septicæmia with a clinical picture similar to that described originally by Abrahams, Hallows, Eyre, and French, and more recently by Abrahams, Hallows, and French.[4]

As regards general treatment, opinion from most units is agreed that immediate isolation, rest in bed, and good ventilation are the essential factors. There appears to be unanimity of opinion that no one drug proved of specific value. Aspirin, quinine or sodium salicylate are especially mentioned in five units; in two of these (M and O) there were no fatalities and a marked absence of severe cases, but their cases only total 12 and therefore do not constitute a reliable criterion.

Three camps (O, J, and F) report that definite disinfecting measures were adopted for all men who showed any signs of "cold"; in O this took the form of a gargle parade (material used not mentioned) every morning, the incidence of influenza was here 5 per cent. In J use was made of the Levick spray and zinc sulphate insufflations for all cases combined with disinfection of buildings, huts, and canteens. The incidence of influenza in this camp was, however, 17·2 per cent. (but as is explained later, this measure was not undertaken until after the main infection had occurred). In F, the Levick spray, zinc sulphate 1 per cent. insufflations, and pot. permang. 1/1000 gargles were used for *all cases reporting*; combined with disinfection of their underclothes and handkerchiefs. The hygienic measures undertaken in this camp, which was a large one, were particularly thorough and apparently most successful since the S.M.O. reports an incidence of influenza in 3 per cent. only of its entire strength.

The highest mortality figures occurred in the two training camps H and G. The newly arrived reinforcements were quartered at these depôts—which are training camps—and the greater number of serious cases occurred among these men, in whom we have previously suggested natural immunity against respiratory infections is low. Added to this, these camps are situated at some distance from their respectively nearest military hospital, and all cases which developed the more serious type of influenza had necessarily to be transported several miles. This procedure, as is probably realised, is disastrous, and may be rightly accredited as at least an important factor among those which reduce the chance of recovery in men who are heavily engaged in fighting a profound toxæmia.

The source of infection is unanimously ascribed to direct contact and the crowding in huts and billets—particularly blamed in two instances. Contact with neighbouring infected camps and townships is especially mentioned by two units.

In Table III. the same units are further analysed to show the relationship of the fatal cases to prophylactic vaccination.

Column 3 designates by a + or a − sign the units in which M.C.V. prophylaxis was instituted at such a date as to warrant an expectation of immunising effect during the recent epidemic, or not, respectively. Against the two camps G and H the signs ± and ∓ respectively are intended to indicate that in G prophylactic vaccination was commenced too late, appeared to precipitate incidence of infection, and was therefore discontinued, whilst at Camp H prophylactic M.C.V. was not commenced until the initial force of the epidemic had passed.

As regards the three general hospitals, in A the epidemic commenced early and prophylactic inoculation was withheld, and the general impression appears to have been that a more severe and prolonged epidemic infection occurred here than at either B or C. At these latter hospitals M.C.V. inoculation was definitely undertaken, and in their experi-

ence the severity of infection and length of epidemic period appeared distinctly less. In B and C, as in A, the deaths that occurred were confined to the uninoculated who had developed severe infection; in the inoculated (Table V. refers to details at B) all recovered, the mortality in this class of case being nil, although many of them were equally severe.

Unit F is seen to have the lowest infection incidence (Column 6), in spite of its being a command depôt of fair average strength; the measures which appear to have coöperated successfully in this unit's efforts at preventive treatment are discussed below under its own heading.

The three small training units J, L, and N contribute collective figures worth consideration, while the smaller units M and O do not provide figures from which any conclusions can be drawn, except as they may add to the totals of others.

The details under K are those not only of London headquarters staff, but of men on leave from France and elsewhere who were treated for influenza at the H.Q. depôt; the figures, therefore, refer to those who were, throughout the general epidemic, in constant contact with the civil population and risked contracting any variation of severity in type of infection that may have been prevalent.

Unit P is a 47-bed convalescent hospital, its conditions and situation being all in favour of a natural escape of infection, whether vaccinated or not; the experience there cannot, therefore, be seriously considered, except in so far as they affect the total figures.

In Column 4 only approximate figures are given, representing the average strength of the units. By the normal process of admission and discharge many of the persons in one unit will have travelled to another, but as all are dealt with over the same period this does not alter the total. Some definite error will have been occasioned by the transfer of cases from France to the United Kingdom units or *vice versa*, and the discharge of some others to New Zealand by hospital ships, &c.; these figures, however, will not have been very great, and do not seriously invalidate the approximate percentages already given as to the incidence of infection and mortality among the total strength of N.Z.E.F. in the United Kingdom.

In Column 8 the percentage of deaths among severe cases is specified; these figures include a few cases other than N.Z. troops, as is shown in Column 9.

Under the heading Total Mortality the actual figures are given for N.Z. troops and other forces, these latter being from among cases, 149 in all, admitted to one or other of the three hospitals, A, B, or C, from neighbouring Imperial units, &c.

With regard to the three fatal cases in N.Z. troops which occurred in hospital C, these were the same three cases as are reported from camp F, where they contracted the infection, and from which they were transferred to hospital C.

The last three sub-columns under 9 refer to the same cases as are given in the first sub-column under "Total N.Z. mortality," but specify whether they were uninoculated or had received one or two doses M.C.V. previously to contracting influenza. The figures at the foot of these columns group the total mortality (for N.Z. troops) in those who were either uninoculated or had received insufficient vaccinal prophylaxis as 76 compared with 9 among those who had the full two doses.

The opinions expressed in column 10 have been abstracted from reports of the units concerned, and, as might have been expected, vary considerably. The consensus of opinion, however, appears to be distinctly more favourable than otherwise regarding the prophylactic value of M.C.V.

The total results as presented in Table III. may be summarised as follows:—

Out of a total average strength of 21,759 approximately 16,104 men received full prophylactic vaccination, and approximately 5700 were uninoculated or had only received one dose of M.C.V.

(1) Out of a total average strength of 21,759 there occurred 3366 cases of influenza—15 %.

(2) Infection incidence in inoculated and uninoculated men is approximately in the proportion of 1·3% to 4·1% (or 1 to 3).

(3) The risk of death in severe and complicated cases in inoculated and uninoculated men is approximately as 8% to 23% (or 1 to 3).

(4) The risk of death among all cases infected varies for the inoculated and uninoculated as 0·26% to 2·2% (or 1 to 9).

Analysis of Results in Various Units.

Special circumstances which modified the general conditions in some units, and other points to which we would direct attention, may now be considered under the heading of the particular unit concerned.

Military Hospital A.

At this hospital the epidemic had assumed serious proportions by about the middle of September, and those in authority deemed it inadvisable to attempt vaccinal prophylaxis under the circumstances. The conditions were aggravated by the fact that this hospital, which (like B) is a General Military Hospital, was at the time absolutely full and very busy on account of the rush of surgical cases from France, and the early cases of influenza occurred among the nursing staff. The experience of this unit (see Tables II. and III.) which definitely did not use M.C.V. as a prophylactic measure, therefore, affords a comparison with that of others where vaccinal prophylaxis was undertaken.

The epidemic at A was of a severe character, and occurred more than three weeks before any epidemic proportions were apparent at the other most comparable unit—namely, Military Hospital B. This unit (B) commenced M.C.V. prophylaxis before epidemic conditions were pronounced; it was situated in a district that locally suffered considerably a little later on, but itself escaped with very light infection.

The staffs of these two hospitals are approximately the same, both male and female, that of B being slightly the larger. It is obviously impossible to determine whether the epidemic effect at B would have been as severe or as extensive among the members of its staff had inoculation not been undertaken—for such variations in epidemic virulence are quite possible—yet the fact remains that of these two very similar hospitals, the influenza incidence was considerably greater and its results more severe in the one which did not have the opportunity of vaccinal prophylaxis. (Table IV.)

TABLE IV.—*Comparison of Inoculated and Uninoculated Hospital Staffs.*

Hospital.	Vaccinal prophylaxis.	Staff.	No. of staff affected.	Deaths.
A.	None.	Approx. 380.	90	1
B.	95 per cent. of strength inoculated.		43	0

Military Hospital B.

Prophylactic inoculation with M.C.V. was fortunately undertaken in this unit sufficiently long before the influenza epidemic commenced for a reasonable expectation of artificial immunity to be anticipated. By the end of the first week in November practically the whole personnel and most patients of this unit had been fully inoculated with M.C.V., and cases which continued to occur in uninoculated persons were in those returning from leave or on leave from France, admitted from overseas or other home forces.

In order to obtain a clear idea of the incidence of infection as between uninoculated and inoculated persons it is necessary to submit figures obtainable for October during which month the epidemic noticeably commenced, and during which there were still a sufficient number of persons uninoculated to provide data for comparison. Thanks to the kind assistance and coöperation of Major A. Hosking, N.Z.M.C., and Captain Gilmore, N.Z.M.C., who have very carefully observed the cases occurring in Hospital B, it has been possible to compile Tables V. and VI., which clearly show the points we wish to emphasise and the clinical details that follow.

TABLE V.—*Incidence of Influenza at Military Hospital B during October, 1918.*

—	Total personnel, &c.	Inoculated persons.	Uninoculated persons.
On Oct. 30th, 1918	2309	1817	492
No. of influenza cases during October	43	25	18
Incidence	1·8%	1·3%	4·1%

From these figures it appears that the inoculated persons (of whom 50 per cent. had received at that time their *first* prophylactic dose only) had already acquired a certain amount of protective immunity, since incidence of infection appears to be more than 3 times greater among the uninoculated than among the inoculated.

During the period of Oct. 4th to Dec. 20th inclusive, 188 cases of influenza occurred at the same hospital B, and these are analysed in Table VI., especially in reference to their having received prophylactic M.C.V. or otherwise.

The figures obtained from this table also strongly suggest that the trouble taken over the provision and administration of a prophylactic vaccine has been justified in the results obtained. From a general survey of the above figures three points stand out quite clearly:—

Firstly, that although as suggested in Table V. the incidence of influenza among inoculated persons has been decreased, yet if infected before receiving their second dose

of vaccine, they are not noticeably better off than the uninoculated as regards the possibility of their developing the more serious complications of the disease. Comparison of the clinical types of the uninoculated with M.C.V. first dose (only) group, shows an almost identical percentage for the two.

Secondly, however, in spite of having suffered the same severity of infection, those comprising the M.C.V. first-dose (only) group, have entirely recovered, as compared with a mortality of 8·3 per cent. in the similar uninoculated people.

Thirdly, in the case of those who had received the two prophylactic doses the group comprises a slightly greater number of patients, but a very much more satisfactory proportion of simple and severe cases—91·5 per cent. for the former and 8·5 per cent. for the latter, which, coupled with a mortality of nil, suggests that the full prophylactic dose when obtained in time has a very definite and satisfactory immunising effect.

Among the most severe cases of the first and second groups in Table VI. there was in general appearance much similarity. In many the same physical signs of bronchitis,

TABLE VI.—*Analysis of 188 Cases of Influenza at Military Hospital B.*

Vaccinal prophylaxis.	Cases.	Clinical types.			% of complicated cases.	Deaths.
		Simple.	Severe.			
			Bronchitic.	Broncho-pneumonia.		
Nil	96	46 = (48%)	33 = (34%)	17 = (18%)	52%	8 = (8·3%)
M.C.V. 1 only ...	45	23 = (51%)	15 = (33%)	7 = (16%)	49%	0
M.C.V. 1 and 2 ...	47	43 = (91·5%)	2 = (4·25%)	2 = (4·25%)	8·5%	0

patchy or confluent broncho-pneumonia, and pleurisy were present. The same symptoms of intense prostration and toxæmia were seen in cases of both groups. Evidence of streptococcal septicæmia was definitely obtained by positive blood cultures in three of the uninoculated cases, all of which died; and in one of the M.C.V. first-dose group that recovered. The most noticeable point of difference, however, between the cases of these two groups lay in the fact that the patients who had received even a single prophylactic dose of M.C.V. reacted to treatment in a way that the uninoculated did not; especially was this power of reaction evident in those cases for which additional treatment was given by specially arranged vaccine in suitable small doses for rapid and repeated administration. These vaccines were used in some cases along with antistreptococcal serum, in fairly full doses. One case in the second group developed the typical heliotrope cyanosis, and for 24 hours appeared quite hopeless, yet recovered. All those among the uninoculated group who became as toxic and as cyanosed as this died.

The post-mortem findings of the fatal cases were similar to those already described[3] and collectively included evidence of acute tracheitis, bronchitis, confluent broncho-pneumonia, small localised abscesses in the lungs, pleurisy, empyema, acute pericarditis, acute nephritis, and toxic degeneration of liver and spleen. Bacteriological examination of lung fluid, pleural fluid, and heart blood revealed the presence of streptococci in 4; and *B. influenzæ* from lung preparations only in 3.

The cases included as severe in the third group of Table VI. (those who had received M.C.V. 1 and 2) did not give any real anxiety and made a fairly uneventful recovery.

Command Depôt F.

The strength of this camp is among the largest dealt with in these notes, and the grade of man involved was mostly other than A class, all having necessarily suffered some form of medical or surgical disability previous to their arrival at the unit for graduated training. Prophylactic vaccination with M.C.V. had been commenced (on Oct. 1st, 1918) for the whole unit shortly before influenza began to show signs of epidemic proportions, either in this camp or surrounding areas.

Lieutenant-Colonel A. D. Carbery, N.Z.M.C., S.M.O. of the unit, has kindly allowed us to extract the data necessary for Tables VII. and VIII. from his précis notes of the cases infected. His opinion epitomised in Table III, is one which has obviously been arrived at after careful observation and occurs in the following context.

"With one or two exceptions all cases affected had been inoculated with one or two doses of M.C.V.; universal inoculation commenced in depôt on Oct. 1st, 1918. Epidemic started before all had been fully immunised. This determined a period of increased susceptibility at the height of the epidemic. I have reason to believe that the incidence of disease and its severity was less in this depôt than in surrounding troops. Without reference to other statistics of incidence and mortality in non-inoculated groups I can only surmise that M.C.V. protection has been beneficial. It is noticeable that the severity of complications decreased as the interval from inoculation date increased."

TABLE VII.—*Distance of Infection from Date of Prophylactic Vaccination.*

Periods following inoculation with—	Number of cases.	Clinical type.		Deaths.
		Simple.	Severe.	
M.C.V. 1: 1st 10 days ...	17	9	8	0
2nd 10 ,, ...	10	9	1	0
M.C.V. 2: 1st 10 ,, ...	27	18	9	3
2nd 10 ,, ...	15	13	2	0
M.C.V. not given	16	16	0	0
Totals	85	65	20	3

In Table VII. the 85 cases which occurred in Camp F. are arranged according to the length of time between infection and the date of their inoculation with either M.C.V. 1 or 2. On the face of it, the uninoculated appear to come out best; their number, however, is so considerably smaller than the inoculated that such a conclusion would not be justifiable especially when it is remembered, as stated above, that the whole unit had been inoculated, these few cases were therefore some of a necessarily very small number who had not yet been inoculated, but contracted influenza fortunately of a mild degree. Of the three deaths, two were of the definitely purulent bronchitis type and the third pneumonic, all apparently the intensely toxic form of infection. Further, these cases, as already mentioned, had to be transported to the nearest Military Hospital C., in whose returns they also appear.

TABLE VIII.—*Summer and Autumn Epidemics Compared.*

Period.	Date.	Prophylactic vaccine.	Total cases of influenza.	Clinical type admitted to hospital.			Deaths.
				Mild.	Bronchitic.	Pneumonic.	
Summer, 1918 (7 weeks).	July 9th to Aug. 27th.	Nil.	Considerably over 240.	193	21	3	0
Autumn, 1918 (8 weeks).	Oct. 10th to Dec. 5th.	M.C.V. 1 and 2.	85	65	15	5	3

The total strength being slightly over 2500 on both occasions.

The total figures for the summer epidemic are not absolutely complete, as the report in this connexion merely says: "A number of cases were also treated at an isolation camp during this (summer) epidemic; many of these were mild influenza." However, even if the comparison is allowed to stand at 240 to 85 for the incidence of infection, the contrast between the two epidemics in the same camp is striking.

It might be suggested that a natural immunity had been conferred by the summer epidemic and so account for the smaller incidence from another following shortly afterwards. It is probable that certain persons in this camp did experience both epidemics there—almost certainly many members of the administrative personnel will have done so; but figures we have obtained show that by the process of admission and discharge approximately three-fourths of the strength is replaced in a period of seven weeks; therefore only one-fourth of those who were in camp at the tail end of the summer epidemic were likely to be present at the commencement of the later one, and a very much smaller number of those who had been present at the earlier and more severe period of the former occasion; moreover, as a command depôt this unit was receiving troops by rail from all other units in the United Kingdom, and therefore very liable to become infected from other areas.

From these details it appears clear that the procedure of prophylactic inoculation with M.C.V. was of distinct value in the presence of the later and more severe epidemic.

But there is another important feature in connexion with this camp which has already been referred to. A thorough and efficient system of disinfection of cases reporting sick was carried out by means of Levick spray, nasal spray, and gargle parades. The method adopted by Lieutenant-Colonel Carbery during the recent epidemic was:—1. Isolation in

observation huts. 2. Gargle—pot. permang. 1–1000 in saline three times a day. 3. Spray to nasal mucous membrane 1 per cent. zinc chloride. 4. Mist. pot. iod. with creosote for tracheal catarrh. 5. Course finished with sterilisation of all underclothing, including handkerchiefs and final use of Levick spray.

This course appears to combine local prophylaxis and treatment *for mild cases*, and without doubt the adequate disinfection of mild cases as they arise, and especially the disinfection of contaminated clothing and infected handkerchiefs, must of necessity reduce the chances of epidemic incidence in catarrhal disease. The fact that this unit did not suffer from any marked increased incidence of infection on the occasion of inoculation, such as occurred at Camp G (*vide infra*), suggests very strongly that these simple and thorough disinfectant measures adopted at the same time as prophylactic vaccination is undertaken will be sufficient to keep down the virulence of epidemic infection so that any risk following upon the temporary increase of susceptibility may be reduced to the unavoidable minimum.

Training Camp G.

The influenza epidemic affected this unit more seriously than any other New Zealand unit in the United Kingdom, and from the concise particulars forwarded by the S.M.O. in charge Table IX. has been prepared. As several points of interest are brought out in this analysis, it may be prefaced by a very brief account of the conditions which prevailed.

Camp G is a well-hutted camp and well drained, but situated in an exposed district and in a bracing but very cold position. The hut accommodation was fully occupied, as two of the most recent reinforcements from New Zealand had arrived in the camp within three weeks of the epidemic outbreak.

The inoculation of these reinforcements was commenced on Oct. 23rd, 1918, and within two days of this the influenza epidemic was raging. There had been a few cases reporting daily, but nothing of moment as regards numbers or severity of cases occurred until this occasion. The first to go down with influenza were members of the first companies inoculated, and after a few days, when the infection assumed serious proportions for the unit, further inoculation was discontinued. The camp also contained some members of an earlier reinforcement whose prophylactic inoculations had been commenced at an earlier date, and the majority of whom had received the two doses of vaccine. All the men of this group who became infected developed the disease during the seven days following their second dose of vaccine. 986 cases of influenza occurred, as shown in Table III., but a detailed analysis of incidence and mortality has been possible in 950 cases only, and for the details of these we are indebted to Major I. O. Veitch, N.Z.M.C., S.M.O. of the unit.

TABLE IX.—*Incidence and Mortality in 950 Cases at Camp G. (October–November, 1918.)*

Following prophylactic inoculation.	Received M.C.V. First dose only.		Received M.C.V. 1st and 2nd doses.		M.C.V. nil.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1st week ...	775	36 (= 4·6%)	36	0	} 34	3
2nd week ...	86	2 (= 2·3%)	0	0		
3rd week ...	19	0	0	0		
Total ...	880	38 (= 4·3%	36	0	34	= 9%

Nursing facilities at the camp were insufficient to cope with the rush of cases that occurred, and severe symptoms quickly arose. The cases were therefore removed to an Imperial military hospital about four miles distant, a proceeding which must have acted adversely upon the severer cases. As these cases by transfer passed out of the control of the S.M.O., details of their clinical types have not been obtainable. All deaths were stated to be from pneumonia.

There are, however, several points arising out of the figures tabulated above which merit careful consideration.

(1) The 34 cases which occurred among the uninoculated represent, as nearly as can be ascertained, an infection incidence of 30 per cent. in this group. The highest mortality percentage occurs in this uninoculated group, being 9 per cent. as compared with 4·3 per cent. in those who had received a single dose of vaccine, and nil among those who had received two doses M.C.V. This group does not comprise many cases, it is true, but the mortality figure is significant, as it corresponds closely to that obtaining (8 per cent.) in the uninoculated group of cases at Military Hospital B (Table VI.).

(2) The first column in Table IX. illustrates in a striking manner how markedly the incidence and the mortality among the inoculated decreased as the length of time between inoculation and infection increased. As is seen in the table, the mortality percentage among those who had received M.C.V. first dose more than a week previously was approximately half that of those whose infection had occurred within seven days of inoculation; and the general susceptibility to infection was much less; while among those who became infected more than 14 days after the single inoculation no fatalities occurred and incidence was even further reduced.

When the total (880) of this group is taken, and the mortality is seen to be under half that of the uninoculated group, it becomes obvious that the decreased mortality amply justifies the potential risk of temporarily increased susceptibility—as appears to have occurred here.

(3) The second group in Table IX., which comprises 36 cases among those who had received two prophylactic doses of vaccine, further demonstrates the fact that all cases in this group occurred among people who had been inoculated less than 8 days; the mortality among these was, however, nil.

Training Camp J.

The experience of this smaller training camp has been given in interesting detail by Captain H. B. Ewen, N.Z.M.C. His facts may be summarised as follows:—

Every officer, N.C.O., and man was inoculated with M.C.V. 1 on Oct. 21st, 1918, and M.C.V. 2 on Oct. 31st. During the three weeks preceding inoculation with M.C.V. 2 22 cases of influenza occurred (= 0·21 per cent. of depôt strength per day). During the three weeks following this date 17 cases occurred (= 0·17 per cent. of the depôt strength per day). During this period three were classified as "serious," and of these two died of septic pneumonia—one had received both doses of M.C.V. (the second dose 20 days previously to admission to hospital), the other was uninoculated.

On the morning of Nov. 22nd (end of three weeks from M.C.V. 2) the entire camp was paraded and insufflated with zinc sulphate 0·3 per cent. (the first occasion since inoculation). The same afternoon, after getting heated during a route march, many of the men became chilled by exposure at a football match. On the 23rd 19 cases reported with influenza; on 24th 5 cases; on 25th 7 cases; and on 26th 2 cases; after which the outbreak rapidly declined. All subsequent cases were mild.

From these details it appears that the inoculation was remotely followed, but local irritation of the respiratory mucous membrane and subsequent exposure to severe weather, immediately followed by a slight recrudescence of influenza incidence; the epidemic infection, however, subsided quickly and produced no severe cases.

The following Table X. contrasts those units whose climatic and housing conditions were fairly similar and all of whom had been equally exposed to whatever increased susceptibility the inoculation by M.C.V. may cause, yet the infection incidence of the units concerned varied considerably. In each case, however, the disinfection methods used also varied.

TABLE X.

Unit.	M.C.V. inoculation.	Local prophylaxis.	Epidemic incidence of camp.
Camp G. ...	Just commenced.	Nil.	36%
Camp J. ...	Completed.	[Injudicious.]	17·2%
Camp F. ...	Completed.	Efficient.	3%

Definite exacerbations of infection seem to be directly attributable in Camp G to the actual M.C.V. inoculation and in J exposure to cold. In F both of these agencies were also present, but without having produced any such result. In the first two units local efforts at antiseptic measures in nose and throat were either nil or indiscriminately applied; while in F very special attention was paid to the local respiratory disinfection.

Convalescent Depôt D.

The epidemic infection in this unit was severe, not so much as regards the numbers infected, for although high (249) these did not represent more than 9·8 per cent. of the total strength (see Table III.), but rather as regards the severity of the cases which developed complications. Practically all men in this camp were inoculated with M.C.V. which had been administered a week to 10 days previous to the date of commencement of epidemic. From the details obtained, Table XI. is drawn to illustrate the infective incidence and mortality among serious cases as regards the interval between inoculation and infection.

It is not known whether there were any uninoculated persons in the depôt who might have contracted the disease; we have merely the statement that "practically all men were inoculated," and the fact that 7 deaths occurred among 34 serious pneumonic cases. Of these 7 cases, as is seen

in Table XI., 2 were among those who had only had one prophylactic dose, and cannot be considered as immunised.

TABLE XI.—*Analysis of the 34 Severe Cases (all Pneumonic) at Camp D.*

Interval between inoculation and infection.	Number of severe cases.	Deaths.	% of deaths to severe cases.
M.C.V. 1 { Within first 10 days ...	3	1	33%
M.C.V. 1 { Within second 10 days ...	3	1	
M.C.V. 2 { Within first 10 days ...	17	4	18%
M.C.V. 2 { Within second 10 days ...	11	1	
Totals	34	7	20%

If the total mortality among serious cases in this inoculated camp be taken as it stands, the result, 20 per cent., compares very favourably with the mortality percentage among serious cases of 50 per cent. and 70 per cent. in non-inoculated persons as occurred at Hospitals A and B (Table III. and Table VI.). If, however, as might be legitimately done, only the 5 cases who received the two prophylactic doses be considered as representing the mortality among the fully inoculated group (Table XI.), then the mortality among serious cases falls to 15 per cent.

There are also other factors to consider in this connexion. The men go to the convalescent depôt straight from hospitals, some more convalescent than others; the conditions of life usually become quickly more rigorous than those of the previous hospital existence. Again, many men are eventually drafted out as P.U. (permanently unfit), and therefore, although there are numbers of fit men in a convalescent camp of approximately 2500, there are also many more men of a lower classification proportionately than in other camps.

Under these circumstances prophylactic vaccination, which was in this unit undertaken comparatively early in the epidemic period, appears to have determined a better ultimate result than might have been expected from the experience of units where uninoculated persons became infected.

Prophylactic Vaccination in Presence of Epidemic.

One further point arises—namely, the question of the use of prophylactic vaccination in the presence of an epidemic. We consider the inference to be drawn from the experiences of camps F, G, and J provides the basis for an answer to this question. Camp F continued inoculation throughout the epidemic period and combined vaccinal prophylaxis with personal hygiene—that is to say, whilst segregating definite cases in observation huts, treated every mild catarrh as an infective focus, and by antiseptic gargles and sprays, plus sterilisation of handkerchiefs and underclothing, endeavoured—efficiently in our opinion—to minimise the risk to the healthy individuals in the camp. At the same time no attempt was made to lower the vitality and resisting power of Nature's first line of defence—the surface cells of the mucous membrane of the upper respiratory tract—of the healthy, uninfected individuals; result, influenza incidence of only 3 per cent. of strength.

This appears to us to be the ideal method, and contrasts with that in Camp G, where vaccinal prophylaxis was discontinued and personal hygiene not carried out—result, an incidence of 36 per cent.; and Camp J, where vaccinal prophylaxis was completed and all was going well, when both healthy and presumably mild catarrhs were *all* sprayed, with the result that many of the previously apparently healthy (but possibly quiescent "carriers"), having had the mucous membranes irritated by the spray and the surface cells devitalised, became active infections, so that the final incidence rate became 17·2 per cent.

References.—1. Eyre and Lowe: Prophylactic Vaccinations against Catarrhal Infections of the Respiratory Tract, THE LANCET, 1918, ii., 484. 2. Emery: The Practitioner, 1919, cii., 74. 3. Abrahams, Hallows, and French; THE LANCET, 1919, i., 1. 4. Abrahams, Hallows, Eyre, and French: THE LANCET, 1917, ii., 377.

THE Research Defence Society has moved its office to the House of the Medical Society of London, 11, Chandos-street, W.

SEVERE DIARRHŒAL OUTBREAK IN ABERDEEN.—A few weeks ago an epidemic of a very severe diarrhœal nature broke out in Aberdeen. Several deaths occurred, and over 1000 persons, both adults and children, were affected. Investigations pointed to a certain milk-supply which was stopped. Cases of secondary infection still occur, but are not of so severe a character. The precise nature of the malady has not so far been conclusively ascertained

SOME POINTS IN THE TREATMENT OF COMPLICATED INFLUENZA.

BY A. J. EAGLETON, M.D. LOND.,
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THE following article deals more fully with the specific treatment advocated by us in THE LANCET of Dec. 7th, 1918. In view of the importance of the treatment of influenza at the present time, we have decided to publish the section on treatment before the remainder of the article.

Treatment.

In cases in which intense faucitis and glossitis followed, with difficulty in taking fluids, we used a mouth-wash of hydrogen peroxide and one of lotio. pot. permang., 1–4000 with NaCl alternately. To allow of nourishment a soft rubber tube passing back to the fauces was fitted to a feeding-cup. The intercellular infusion of hot saline in septicæmic cases was tried in a few instances without result.

We began by giving all cases showing actual consolidation of the lung and all septicæmic cases antistreptococcic serum in small doses (10 c.cm.) as often as requisite; and where a secondary infection had not yet shown itself, we gave one prophylactic dose of 10 c.cm. In a number of cases of purulent bronchitis and broncho-pneumonia the serum seemed to have some value and the patients recovered, while in others of exactly the same type clinically, the method did not save the patient. The antistreptococcic serum used was that of Burroughs and Wellcome, the Lister Institute, and Mulford.

Then, when after the first autopsies we were certain that two varieties of secondary infection existed together or separately, we determined to try the value of a direct smear of the sputum as some indication of the nature of the infection. In a number of smears either innumerable *Streptococcus longus* or enormous quantities of pneumococci were present, rarely the two together in anything like equal numbers. Meanwhile we had conceived the idea of preparing an antipneumococcal serum and a fresh complementary serum as described below. These sera had undoubted value.

To turn now to medicinal treatment. The terminal factor in most of our fatal cases was dilatation of the right heart with failure of the heart muscle, and our main effort was to lighten the strain upon this organ. The nursing staff did their all to prevent the patients moving in any way. The patients were propped up, with a donkey pillow beneath the knees to prevent slipping, and to ensure sleep and quietude we used morphia in adequate doses and combined with atropine; and the more cases in which this drug was used the more convinced we were of its value.

Next we treated a number of the cases from the start on tinct. strophanth., as advocated by Major Elliot Dickson. These cases did well for the most part. The dose given was 5 minims of the B.P. tinct. strophanthi, and repeated every two hours; even when the drug was given for some days on end we noticed no ill-effects. Digitalin was also given hypodermically in a series of cases without, in our opinion, much benefit. For those cases which were complicated by abdominal distension, due possibly to some toxæmic paresis of the bowel, we relied on spt. æth. co. and spt. cajuputi in ordinary doses and with good results. The laryngeal and tracheal symptoms were treated by mustard and linseed poultices locally and, in the first stages, by inhalations of tr. benzoin. We found an ordinary menthol inhalant useful when the condition was becoming subacute.

The majority of our patients are used to a certain amount of alcohol, and we prescribed this drug in practically every even moderately severe case. Another measure to which we attribute great importance is the nursing of these lung infections in the open air.

Prophylactic Vaccination.

We have made extensive use of vaccines with a view to prevention of catarrhal and pneumonic conditions. We have also in many cases carried out a routine prophylactic inoculation of all cases suffering from measles with small doses of mixed vaccines containing *B. influenzæ* and other

organisms—e.g., during June, 1918: P.B. VIII., *Streptococcus longus*, pneumococcus, *B. influenzæ*, *M. catarrhalis* 10 millions each per c.cm., 0·25, 0·5, and 1 c.cm. The small doses were used as we were in the presence of an epidemic. Previously we had been working with larger doses for prophylaxis only– e.g.: November, 1917, Br. 4, 2500 millions *B. influenzæ*, 500 millions *Friedländer*, dose 0·25, followed by 0·5 c.cm. But a prolonged negative phase had to be considered, and most of the newly arrived troops had slight catarrh. That the negative phase with the mixed catarrhal vaccine (Eyre and Lowe) is a definite factor has since been shown in the case of New Zealand troops. It has been difficult to obtain reliable figures, though what we have attest the value of such prophylactic inoculation.

The reactions were in no case severe, many hundred men being inoculated. One vaccine consisted of *Streptococcus longus*, 4 millions, *Pneumococcus*, 6 millions, *B. influenzæ*, 1 million, *M. catarrhalis*, 1 million per c.cm.; dose, 0·5 c.cm., followed in ten days by 1 c.cm. This was given in May, 1918. Up to the end of July none of the 507 men who received two doses were taken to hospital or went sick in quarters. No negative phase was seen.

During the last three or four months the mixed catarrhal vaccine prepared by Dr. Eyre has been available in large quantities, and this has been used by the medical officers in charge of units in our area.

The object in prophylaxis was to immunise the troops against the organisms locally predominant. A very good general idea of the prevalence of various bacteria was obtained from study of the cultures made in the course of routine swabbing for the meningococcus. Our vaccines were therefore varied to suit what we judged to be the local infection, and thus from October, 1917, till the present time we have prepared 12 stock mixtures all differing more or less. The organisms used were derived from the cultures above mentioned, post-mortem examinations, blood cultures, and cultivation of sputum of patients.

To show the variations in organisms at different times a return of sputum analysis from patients suffering from catarrhal and pulmonary diseases is given. This does not include sputa examined by direct methods without culture, and only the main organisms are given.

1918.	No. examined.	Pneum.	*Staph. aur.*	*B. Influen.*	*B. Fried.*	*Strep. long.*	*M. catarrh.*
Jan. ... Feb. ... March ...	21	2	16	11	4	2	2
April ... May ...	20	11	13	3	4	10	4
June ...	14	11	12	4	0	9	1
Sept. ...	10	6	8	9	0	10	0
Oct. ...	16	14	4	4	5	5	7
Nov. (two weeks) ...	17	14	2	5	4	5	3

We had, indeed, ample warning of the possibility of widespread influenzal disease. It is obvious that a knowledge of the local pathogenic bacteria infesting the human air passages is of paramount importance if epidemics of catarrhal disease are to be anticipated and checked at an early stage, and we see that the infection varies greatly in any one district. It might, perhaps, be maintained that all over England the changes in the bacterial flora might be coincident (or nearly so) in time.

From our experience in this district we believe that the throat organisms prevalent amongst the healthy population are the same as those found in cases of catarrhal and pulmonary disease in the same area, and that by a constant study of the former we may anticipate and check any increase of the latter. One cannot help thinking that if the same "prophylactic" care could be taken amongst the civil population as has been taken amongst the military the incidence of the disease could be effectively diminished and curative measures prepared.

Vaccine and Serum Treatment of Actual Cases.

In the treatment of actual cases our methods have been varied to suit changes in character of the infection. Thus at first the complication of influenza commonly met with was "more or less bronchitis with or without high pyrexia." Only the more serious of such cases filtered to the main hospital in the area. The S.M.O., A.I.F., Sutton Veny, very kindly lent us charts of 138 cases treated in the local camp hospital with vaccine P.B. VII. (*B. influenzæ* and *M. catarrhalis* of each 20 millions per c.cm.). 0·25 c.cm. was given as a first dose. "It seems fair to say that in the pure influenza the cases do not appear to have been influenced for good or bad; in the bronchitic cases improvement is noted in many instances."

A similar vaccine ("A") prepared in this laboratory was used in some of the cases quoted by Colonel W. Marshall Macdonald and others. It appears to have been of some benefit, but it was intended for prophylaxis, so that the dosage was relatively high. Such acute cases as reported in that article would be treated by us with serum in the manner about to be described.

In our own area the complications of influenza until recently were generally mild, in fact, suitable for vaccine treatment. We had, however, decided that, in any acute pulmonary or septicæmic complications of influenza, passive immunisation was likely to be of more benefit. We had already learnt that in the secondary infections following influenza or combined with it the important organisms are *Streptococcus longus* and pneumococcus, and as no pneumococcal serum was available we decided in acute cases to use antistreptococcal serum pending bacteriological diagnosis.

Thus, when in September one of us was sent to investigate and assist in the treatment of a group of septicæmic and pulmonary cases at a New Zealand Hospital antistreptococcal serum was employed liberally, and in many cases with good results. The infection happened to be a suitable one (*Streptococcus longus* and *B. influenzæ*). Three different makes of serum were used and, where one variety failed, another seemed of benefit. In some of the less acute cases a vaccine prepared from the organisms derived from the blood and sputa was used in small doses (P.B. XII.) and patients in the same wards were prophylactically inoculated. From the end of September the streptococcal infections gradually got less frequent, with a rise in the pneumococcal.

Antipneumococcal Serum.

Antibacterial sera can be produced, as is well known, by injecting organisms into animals not susceptible to them—e.g., antimeningococcal serum (Gordon and others). It has also been used by Preston Kyes in the case of pneumococcus, and following his work we have attempted a rapid production of serum by inoculating domestic fowls with massive doses of pneumococci. At first the procedure was as follows: An intravenous inoculation was given on three consecutive days; on the fourth day a culture was taken from the blood, and, if no growth was obtained, the animal was bled on the fifth day. The blood invariably proved sterile. The serum obtained was sterilised by heating for 20 minutes at 60°.

We met with difficulties apart from the fact that fowls are scarce and expensive.

1. We had to produce a high antibody content with great rapidity. We had no means except animal experiment to test the value of the serum, the agglutinating power of a serum being no measure of therapeutic value. Only two experiments showed any great protective power in the serum. Several other experiments failed to elicit any power in the serum to protect mice. We are still working on this point. The experimental work was meagre, but the rush of work has been tremendous. The severity and number of cases made us decide to give the serum a trial. At first only patients apparently moribund were selected. The results will be given later.

2. We found that the yield of serum from different bleedings varied enormously; it was hard to obtain the serum free from hæmolysis. In view of this fact, and also being unable to standardise the value of each separate collection of serum, we tried to arrive at a technique which should give uniform preparations. The following is the method now used:—

Two strains of pneumococci are employed for each fowl; these have been recently isolated either from the blood or lung post mortem or from sputa of serious cases, and proved virulent for mice in small doses. Intraperitoneal injections (as recommended by Kyes) are given three times in one week. The dose is 10 c.cm. of an emulsion containing 12½–20

million per c.cm. (as measured by the vanishing point). The day after the third dose the fowl is bled by needling the heart; this can be carried out by thrusting the needle boldly towards the heart from the episternal notch; should the operation be unsuccessful, the animal is killed by decapitation under an anæsthetic. 8 to 10 c.cm. of blood is obtained by needling and squirted into a sterile test-tube containing an equal amount of 1 per cent. sodium citrate in saline, and well mixed. This is stood in the dark in a cold cupboard till the next day, when the corpuscles will have sedimented completely. The supernatant fluid is removed and heated at 60° C. for 20 minutes. The preparation so obtained is turbid and needs thorough shaking before use. We have, therefore, never given it intravenously. It is not a true serum, but a diluted blood plasma, containing in all probability dead pneumococci or their products. We have cultivated the blood when freshly withdrawn, but never obtained a growth of pneumococcus. At first we combined with this "plasma" fluid a vaccine (P.B. XII.), but probably the serum as prepared is of the nature of a sero-vaccine (comparable to Chantemesse's serum?). A dose of 2–4 c.cm. is given.

Fresh Complement.

Any "complement" in the fowl's serum is lost in preparation. Moreover, fresh serum has been used in many diseases; the more recent the serum the better. We think it will be generally conceded that in all infectious diseases terminating fatally there must be an inadequate production of specific protective properties, and also an exhaustion of certain non-specific bodies or attributes of the blood serum; these latter, we believe, could be supplied by the injection of absolutely fresh serum collected aseptically and not subjected to heating.

Guinea-pigs' serum contains a large amount of complement and probably other substances (or has other attributes) less easy of demonstration. We decided to use fresh guinea-pigs' serum both in combination with the antipneumococcal serum and alone. We speak of this fresh serum as "complement," though we do not say that this particular substance is the only active agent employed.

The method of preparation is very simple. The guinea-pig's blood is obtained by needling the heart; 8 c.cm. can be safely withdrawn. The blood is allowed to clot in the cold and the serum is collected the next day, diluted with three parts of sterile saline containing 0·5 per cent. carbolic and stored in a sterile rubber-capped dark-glassed bottle. It is generally used the same day, and never kept longer than 48 hours after collection. It is injected into the subcutaneous tissue of the abdomen in amounts of 4–10 c.cm. If given with antipneumococcal or antistreptococcal serum it is mixed in the syringe prior to injection.

The chief danger is contamination during preparation, in spite of all precautions. We have, however, been giving an average of three or four injections a day to different patients for the last five or six weeks, and no untoward complications have occurred. As to the benefit conferred by its use in some cases we have little doubt. It should also be of value in all infectious conditions, and we trust that others will give it a trial.

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THE 2nd Southern General Hospital has been practically closed for the admission of patients. The base of the hospital is the King Edward VII. Memorial Wing of the Bristol Royal Infirmary. The sections and auxiliaries of the hospital brought the total of beds up to 5800, and at the close of 1918 the total number of patients who had passed through the 2nd Southern General Hospital was 86,000.—The Royal Naval Auxiliary Hospital, Truro, which was opened in January, 1916, is soon to be closed.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

POLYORRHOMENITIS.

BY W. E. COOKE, M.D. LIVERP., F.R.C.P. EDIN., D.P.H. LOND.,
TEMPORARY CAPTAIN, R.A.M.C.

POLYORRHOMENITIS, polyserositis, Concato's disease, or hyaloserositis is sufficiently uncommon to warrant the publication of this case.

The patient, aged 29, a Turkish corporal, was admitted to a P. of W. hospital on Jan. 16th, complaining of malaise, slight cough, and pains in back and sides of chest. He had been in the Army for some years prior to 1914. He had had no previous illness, and was always able to perform his duties. No family history of tuberculosis was elicited. Life-long abstainer; no history or evidence of syphilis. I saw him on Feb. 5th. His condition was as follows: Temperature 98° F., respirations 20 with slight dyspnœa, pulse 88—good volume and tension. He was slightly cyanosed; venules of cheeks prominent; conjunctivæ had subicteral tinge. There was marked epigastric pulsation. Hypertrophic pulmonary arthropathy was marked in the hands. Diastolic collapse of the cervical veins was not present; no paradoxical pulse.

Lungs: Chest expansion equal but poor. Litten's sign absent. Vocal fremitus very much diminished over both sides of chest. The percussion note was much impaired; in no region absolute flatness. On auscultation the breath sounds were faintly heard over lower three-fourths of chest. At the apices in front the breath sounds were more audible. Expiration was prolonged over whole chest; at bases were a few moist râles. Creaks were heard all over the chest. Sputum: Scanty, muco-purulent. No tubercle bacilli found; pneumococci present in abundance. Heart: The apex impulse could not be seen; marked epigastric pulsation; cervical veins not prominent. By palpation a diffuse very faint systolic impulse could be detected in fourth and fifth interspaces, inside nipple line. Percussion showed area of dullness from 2 inches on right of sternum to 4 inches on left, at level of fourth interspace. The dullness extended upwards to sternal notch, and laterally blended with impaired resonance over lungs. Auscultation: The heart sounds were faintly heard at the apex. The pulmonic second sound was very loud compared with the aortic. Crackling râles over whole of sternum and adjacent chest wall. Abdomen: The liver extended an inch below costal margin; no ascites. Urine: Sp. gr. 1018; no albumin, no sugar.

The patient appeared to progress favourably up to the night of Feb. 8th, when he had an attack of dyspnœa. The anhelation became extreme and he died on the morning of Feb. 9th, with all the signs of œdema of the lungs.

Post-mortem.—The sternum and costal cartilages were firmly bound down by a fibrous tissue to the underlying structures. Extending from the superior mediastinum and invading the pleuræ laterally was a dense mass of yellowish white glistening fibrous tissue. Where it had been separated from the anterior chest wall the tissue had a honeycomb appearance. Pericardium: Could not be separated from the fibrous mass which covered it, in various thicknesses, from 1½ inches immediately behind sternum to ½ inch at apex. On section the pericardium was thickened from ¼ inch to ½ inch; inner surface presented smooth porcelain white appearance. No adhesions between peri- and epi-cardial layers. About one ounce of pericardial fluid. Heart: The right ventricle was hypertrophied and dilated; right auricle very distended. On surface of both auricles and ventricles were numerous white patches from ¼ inch square to 1½ inches by ⅔ inch. In thickness the larger milk spots were about ¼ inch in the centre gradually blending with the normal epicardium. The heart muscle appeared normal; no fibrous invasion from spots demonstrable. Lungs: Dense pleural adhesions extended from apex to base. In some of the interstices there was a small amount—a few drachms—of pale serous fluid. The parietal pleura was in places ¼ inch thick and of pearly white. When the lungs were freed they did not collapse to the usual dimensions. Surface dull, of a faint strawberry tint. The visceral pleura was appreciably thickened but allowed colour of lung to show through; slight puckerings. The puckerings seemed due to drawing in of pleura in attempt to collapse and not to fibrous invasion of lung tissue. On section there was very little pigmentation.

Larger bronchi congested; bases of lungs œdematous. There was very little macroscopic evidence of fibroid infiltration from the pleura and no visible bronchiectasis. The bronchial glands were inflamed, slightly enlarged; no signs of suppuration or caseation. No macroscopic evidence of tubercle in glands, lungs, or pleura. No evidence of atheroma in pulmonary arteries.

Abdomen: Peritoneum: There was about 10 ounces of pale straw-coloured fluid in the pelvis. The parietal peritoneum and the omentum appeared normal. In mesentery of small intestine and mesocolon were about ten milky-white areas, the largest 2 by 1 inch. The thickness in the centre was about 1/12 inch, gradually thinning out until it blended with normal peritoneum. No appreciable shortening of mesentery and no fibrosis of omentum. The mesenteric glands were normal. Liver: Slightly enlarged and showed congestion, with some fatty change. On diaphragmatic surface of left lobe, extending for a short distance on to the right lobe, the capsule showed slight diffuse thickening, but no infiltration of fibrosis into liver tissue. Spleen: Slightly smaller than normal, the spleen showed to perfection the "cake-icing" condition described by Adami. The whole of the convex surface was covered with a dense, porcelain-like, hyaline tissue, ¾ inch thick, terminating somewhat abruptly at margins of spleen, and fusing into apparently normal splenic capsule. No fibroid invasion of splenic tissue. Kidneys, adrenals, pancreas, bladder, stomach, intestines, and blood-vessels appeared normal.

The interesting features were the negative history, the absence of symptoms previous to admission, the absence, post mortem, of any indication of tuberculosis or organic disease to account for the conditions, and the absence of invasion (except an extremely small amount in the lungs) of the organs by the fibrous tissue growth. The case is recorded by the kind permission of Lieutenant-Colonel J. W. H. Brown, (T.D.), R.A.M.C. T.F., O.C. No. 6 P. of W. Hospital, E.E.F.

A NOTE ON

THE PRESENT EPIDEMIC OF INFLUENZA.

BY M. J. ROWLANDS, M.D. BRUX., M.R.C.S., L.R.C.P.,
PATHOLOGIST, LEWISHAM MILITARY HOSPITAL; LATE PATHOLOGIST, ROYAL VICTORIA HOSPITAL, NETLEY.

DURING the present epidemic my commanding officer consulted me with a view to vaccine therapy. The results justify the treatment by vaccine, which up to the present is the only form that has given any satisfaction.

There have been, from a clinical point of view, three distinct types of cases.

First type.—This, which I will call the "Typhoidal type," is one of the most severe forms. The patient runs a temperature of 103° to 104° F., is wandering, the tongue is dry and brown, epistaxis is a marked symptom, also diarrhœa with some distension of the abdomen. The chest symptoms are a cough with little, if any, expectoration, and on physical examination fine crepitations are heard all over the chest. Respiration and pulse-rate are high. This type is usually fatal early in the disease. No post-mortems have been done, so that I am not able to discuss the morbid conditions. The examination of the sputa in these cases has shown that a *Streptococcus brevis* is the chief offender, together with the Pfeiffer bacillus.

Second type.—I will call this the "Pleuro-pneumonia type." This does not differ from the ordinary case which one meets with in practice following exposures and colds. The type of pneumonia is usually lobar, and the pleurisy basal or diaphragmatic. Examination of sputum shows that the chief offending organisms with the Pfeiffer bacillus are Friedländer's bacillus and pneumococcus.

Third type.—This is the one in which the temperature may not be high, 101° or 102°, but the great difficulty in getting sufficient air entry into the lung is very distressing to the patients. They are cyanosed and remain so, even though their temperature be nearly normal. They have an irritating cough, but little expectoration. The attacks of coughing very markedly increase the cyanosis; the pulse-rate also rises and the pulse becomes intermittent. I have no doubt that this is due to enlargement of right side of heart. One patient is still markedly cyanosed, although his temperature has been normal for six days. The offending organism in this type, added to the Pfeiffer bacillus, is *Micrococcus catarrhalis*.

Each of these types has been well marked in the cases under my care, and it seems fairly easy from the clinical aspect to diagnose the offending organism.

Space permits only a brief reference to the results of vaccine treatment. For example, during one week we treated 50 cases, all of which were acute, with only 2 deaths. Some of our stock bottles contained more streptococci than others, and some more pneumococci and *M. catarrhalis*. Which type was given depended upon the examination of the sputum. The vaccine was made up to a strength of 200 millions each per c.cm. of Pfeiffer bacillus, streptococcus, *M. catarrhalis*, pneumobacillus, and pneumococcus. The initial dose given has been 0·4 c.cm. In no case has any evil effect been seen either on temperature or physical condition, and in almost every case very marked improvement. The same results have occurred in one's private practice. I am indebted to Colonel F. S. Toogood and his medical officers for their clinical assistance, also to my assistant, Miss Engall, who worked so hard at preparing and counting the vaccines.

Knightsbridge, S.W.

INFLUENZA AND DIPHTHERIA.

BY EVELYN A. CONSTABLE, M.B., B.S. DURH.,
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OTHER practitioners must have noticed that diphtheria is one of the occasional sequelæ of influenza. The usual pallor of diphtheria is in marked contrast to the flushed facies of the initial influenza in my experience during the September-November epidemic. (I was a victim myself to the June-July outbreak and hence was unable to make any observations then.) The following are some of the cases I can recall:—

CASE 1.—A boy, aged about 9 years, had typical influenza and very severe broncho-pneumonia. He was allowed up at the end of three weeks. Two days later he complained of "sore throat." There was a sloughing patch on one tonsil and the glands in the neck were enlarged. The swab was positive and I sent the child to the fever hospital. When I saw him after his discharge, about eight weeks later, he was well.

CASE 2.—A girl, aged about 12 years, as well as her mother and adult brother and sister, had all been under my care for typical influenza. About two weeks after convalescence the patient developed marked pallor and a nasal discharge. Swabs positive for about three weeks. Recovery ensued.

CASE 3.—A girl, about 6 years of age, her father and brother all had influenza and bronchial catarrh. Two weeks after onset of influenza nasal discharge started in patient. Swab positive (brother's swab negative).

CASES 4 AND 5.—A man, aged 38, had typical influenza. One week later membrane developed on right tonsil, with enlargement of submaxillary glands. He became very pale and ceased sweating. The swab was positive, and remained so for quite a month. One child became a carrier, and later his wife, who had had a very mild attack of influenza, developed a septic throat, which also gave a positive swab. Another child of this couple (aged 15 years) had fever and epistaxis. She was swabbed on two occasions with negative results; this was interesting, as she had a large cleft-palate, thus giving one an unusually good view of the naso-pharynx. Her immunity was doubtless due to the fact that she had had diphtheria in infancy.

CASE 6.—A boy, aged about 8 years, had influenza, followed two weeks later by pharyngeal diphtheria. Swab positive. He developed a systolic murmur at cardiac apex; eventually did well.

CASE 7.—The patient in this case was a baby. A whole family had influenza and "doctored themselves." The baby developed membranous croup just after family were convalescent; sent to fever hospital at once. Made good recovery. Our medical officer of health, Dr. D. C. Kirkhope (who makes it a rule to swab all children of school-going age who have been in contact with any notified case), in this house discovered two other children with positive swabs (one a week and the other two or three weeks after the baby had been removed); acting on his advice they consulted me, as their family doctor, and in each case I found clinical diphtheria, and sent them to the fever hospital.

It is curious that *all* cases recovered from their double dose of toxin.

West Green, N.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ELECTRO-THERAPEUTICS.

ON March 21st the Section of Electro-therapeutics held a combined meeting with the Institution of Electrical Engineers, when Dr. C. R. C. LYSTER, the President of the section, expressed a warm welcome to the members of the visiting institution, and said he hoped it was only the first of a series of such meetings, because medical electricians were only amateurs in electrical science, and as they had much to learn a closer coöperation between the two professions was desirable. He invited Mr. Wordingham, the President of the institution, to take the chair.

Mr. WORDINGHAM said how highly the members of the institution appreciated the invitation of the Royal Society of Medicine. He entirely endorsed all that Dr. Lyster had said in regard to the benefits to be expected from the coöperation of the two professions. He hoped that when medical men stated what they required electricians would not be found wanting, as designers and inventors, in adequately meeting those needs. He referred to the successful meeting of the institution last year with the Society of Radiology and Physiotherapy and the exhibition of apparatus, and said that a similar exhibition of apparatus was an adjunct of the present meeting.

Electrical Methods of Measuring Body Temperatures.

Mr. ROBERT S. WHIPPLE read a paper on "Some Notes on Electrical Methods of Measuring Body Temperatures." He said Becquerel and Breschet, in 1835, were the first observers to determine, by electrical means, the temperature of animal tissues; they made use of a single pair of copper-steel couples, which were thrust into the animal's tissues. In 1908 Professor A. Gamgee commenced his researches on the subject, and in a paper on Clinical Thermometry pointed out the importance of a study of body temperatures, especially in observations on the preliminary stage of phthisis, when physical signs of such disease are almost, if not entirely, in abeyance. Gamgee decided to adopt thermo-electric couples, in preference to resistance thermometers, and for high precision it seemed a wise decision. He used two kinds of thermometer: one for taking the temperature of the surface of the skin, the second for testing that of body cavities. The couples were made of copper-constantan. In such couples, temperatures are determined by measuring the electromotive force in the circuit, this bearing a definite relation to the difference in temperature between the two junctions of the circuit. This necessitates the control of the temperature of one of the junctions, generally the colder of the two, and termed the "cold junction," the difference in temperature between it and the "hot" junction (the thermometer in contact with the human body) being determined by the electromotive force recorded by the galvanometer. Gamgee placed his cold junction in a water-bath of exactly controlled temperature. Modifications by Sims Woodhead and Varrier-Jones[1] enabled the cold junction to be kept for long periods at a constant temperature—i.e., within 0·01° C. Both skin and rectal thermo-couples were minutely described, aided by lantern slides. The thermometer could be left in the rectum, without causing the patient inconvenience, for 24 hours or more. The wires from it are led to the recording apparatus, a moving-coil galvanometer of the D'Arsonval type, the movements of which are recorded, either photographically or autographically, by an inking device. Later views favour the use of resistance thermometry, as for this no elaborate thermostat is required, and a ten-fold larger deflection could be obtained with the same galvanometer. The speaker stated that the difficulty of making satisfactory surface thermometers and attaching them to the patient is considerable. The design of thermometer by Mr. Varrier-Jones consists of a fine platinum wire wound round a mica frame in the form of a cross, the coil on its frame being enclosed in a silver tube, the tube being so constructed as not to irritate, and therefore stimulate, the sphincter. The coil is connected to the recording instrument. In practice the instrument is simple to operate and its use can be learned in an hour. It will record the surface temperature of the body within five minutes of its insertion. Mr. Whipple acknowledged his indebtedness to Professor Sims Woodhead and Mr. P. C. Varrier-Jones.

Professor SIMS WOODHEAD expressed his high appreciation of the work done by the Cambridge Scientific Instrument Company, which had contributed so much to the continuation of the research of Gamgee and others on this subject. The method had been particularly valuable in determining the maximum and minimum temperatures of tuberculinised patients, as well as more or less continuous temperature records. It also enabled the observer to know how long the effect of tuberculin lasted; and to see the smaller rises and fluctuations which occurred after the taking of food, the taking of water, and after exercise. A number of charts were projected on the screen to show these changes. He expressed the hope that a good many diseases would be worked out in this way. It could be done easily, because the patient could be in the hospital and the apparatus in the laboratory.

Mr. VARRIER-JONES explained that thermo-couples were found to be too delicate for taking the temperatures of cattle, therefore resistance thermometers were employed. In reference to tuberculosis, an exactly similar condition could be experimentally produced in a calf giving the same temperature characters as existed in the human subject. At the present time the rectal thermometer could be used with absolute certainty.

Professor PORTER alluded to the great difficulty of accurately recording the temperature of an external point, such as on the surface of the skin, and he was not certain that had been overcome by the simple thermo-couple. Still, to the medical man no doubt the important matter was the variation of the temperature. He suggested the use of a smaller surface pad.

Dr. E. P. CUMBERBATCH thought Mr. Whipple's apparatus ought to be of considerable use in determining the passage through the tissues of electrical currents of high-frequency oscillation. During the past few years he had been using these currents for raising the temperature of different parts of the body, especially internal parts. From inquiries he had made among physicists he had not been able to discover exactly what path the current took. Recently he conducted experiments to determine the temperature of the interior of the body when passing a diathermy current through. One patient had a deep sinus passing down to the kidney region, and a clinical thermometer was placed in the depth of the sinus, with one electrode on the front of the trunk, and one on the back of the trunk. After the current had been passing 20 minutes the clinical thermometer showed no elevation of temperature. Therefore it seemed to show that the current travelled along the peripheral surface of the body.

The Electro-Cardiograph.

Mr. WHIPPLE next read a paper on "Some Notes on the Electro-Cardiograph." Professor A. W. Waller was the first physiologist, he said, to show that the electric potentials developed in the heart at each contraction sufficed to deflect a sensitive galvanometer connected to the limbs of the human subject. Little progress in the matter, however, was made until Professor Einthoven, of Leyden, invented a string galvanometer in 1901. This had a powerful electro-magnet, and a comparatively short silvered quartz fibre as the moving system. He used a single stretched fibre.[2] The cardiograph now in use preserved those main features, the "string" being a quartz or glass thread 0·003 mm. in diameter. The equipment required in order to obtain an electro-cardiogram was stated as follows: (1) the galvanometer which receives the electrical impulses of the heart; (2) the camera to record the movements of the fibre in the galvanometer; (3) a time-marker or mechanism for marking time-intervals on the photographic plate; (4) a source of illumination, by means of which the photographs are obtained; (5) the electric equipment for making the necessary standardisation and other adjustments; (6) the electrodes for making electrical connexion to the patient. These were all discussed in detail; the best source of light is considered to be an arc lamp; probably the Ediswan "Point-o'-lite" lamp would become the one generally used in electro-cardiograph work.

[1] THE LANCET, 1916, i., 173, 281.

[2] THE LANCET, 1912, i., 853; 1913, ii., 380.

Dr. THOMAS LEWIS said it was his privilege, 10 years ago, to introduce to clinical medicine in this country the electrocardiograph, and during the last eight years his laboratory at University College had worked in active coöperation with Mr. Whipple's firm with very great advantage. If any adjustment were required to increase ease and speed of working—the latter being an important matter in hospital work—the request was at once met, and hence he was able strongly to endorse the remarks as to the importance of coöperation between the two professions. Three curves of a patient's heart could now be taken in a few minutes. He projected on to the screen a series of charts, and explained the interpretations of the oscillations. Special attention was devoted to the records in the condition of heart-block. By connecting the string galvanometer to a microphonic system records could be obtained of heart sounds; and he showed charts of these also.

Dr. ALEXANDER MORISON thought the instrument particularly valuable for rendering evident heart conditions and sounds which by ordinary methods would be missed.

Dr. SYDNEY RUSS said that in looking at the tracings which had been obtained by means of the machine, he noticed sometimes a series of what looked like mechanical vibrations, which seemed to have a different periodicity. He asked whether these were likely to have any physiological basis. Sometimes also, in the apparently quiescent part of the curve, one noticed occasionally a rise, and sometimes it would fall back to its previous level. That might likewise have a physiological basis. He referred to Professor Gee's experiments on the resistance of the human body and how it could be considerably lessened by preparation of the surface of the skin.

Dr. WALL said he could not praise too highly the apparatus now shown, which seemed to be not only perfectly constructed, but even fool-proof. Every ward in the hospital with which he was connected had a wire connexion with the apparatus so that the tracings of every patient could be taken and recorded. Though the apparatus had been installed several years it had never been out of order, nor had the galvanometer or time-recorder. He thought it would be an advantage to have the control-board compensating wire covered in. For some patients—those who could not sit in a chair, for instance—he thought it would be well to have some form of electrode which could be bound round the limb. He showed a flexible electrode consisting of copper filings and string, which could encircle a limb and be kept in position by means of tapes, having been soaked in saline solution to keep it moist.

Professor PORTER said the first instrument for indicating currents by means of the movement of a metal strip between the poles was devised by Cumming in 1826, while Haydn devised the gold-leaf telegraph in 1846.

The author undertook to reply to the discussions in writing.

SECTION FOR THE STUDY OF DISEASE IN CHILDREN.

Exhibition of Cases.

A MEETING of this section was held on March 28th, Dr. PORTER PARKINSON, the President, being in the chair.

Dr. A. E. COCKAYNE showed a case of Congenital Absence of the Lower Portion of the Left Pectoralis Major Muscle and Left Mammary Gland. The case was that of a boy aged 4½ years. His father and mother were unrelated and had two other children, both of whom were normal. There was no history of a similar condition in the family. The boy was small but well nourished. The left pectoralis major muscle was absent, with the exception of the clavicular portion and a small part of the sternal portion. There also appeared to be some deficiency of the subcutaneous tissue on the left side. The left areola was as large as the right, but the nipple was retracted and the mammary gland could not be felt. The right mammary gland was palpable. There were no other defects of development. He thought that the absence of the mammary gland might be explained by a lack of blood-supply.

Dr. ERIC PRITCHARD spoke of the frequency of congenital deficiency of muscle, especially partial or complete absence of pectoralis major and minor. He had never noticed the accompanying defect of the nipple.

Mr. PHILIP TURNER showed two cases of Undescended Testicle. These patients, together with one adult, were all whom he had been able to trace of a series of 12 who had been operated upon for this condition during the summer and autumn of 1914, an account of which appeared in the Proceedings for December of that year. The chief feature of the operation was that the testicle was transplanted through the scrotal septum to the opposite side. No sutures were needed. In these three cases the end result was quite satisfactory. An interesting development was an increase in the size of the testicle. He agreed that undescended testicles were usually functionless. The increase in size after this operation would lead one to hope that if it were done before puberty the testicle might function normally.

Dr. H. C. CAMERON spoke of the great activity of the cremasteric muscle, which often led to the testicles being wrongly regarded as undescended in children. He thought that many of the operations which had been considered successful had probably been done in cases of this hypermobility, for they were generally performed on school children, and the testicle only became anchored at about puberty. The beneficial effects of thyroid treatment might be similarly explained.

SOCIÉTÉ DE BIOLOGIE, PARIS.—The following is a summary of some of the papers read at the meetings of this society held on March 15th and 22nd.

Ch. Lesieur et Paul Jacquet.—Selective Staining of Malarial Blood.

Technique applicable à tous les colorants hématologiques à base d'éosinates et d'azur. Fixation préalable à l'alcool absolu. Coloration rapide en verre de montre et en solution faiblement diluée. La neutralité de l'eau doit être parfaite. Les préparations sont d'une transparence particulière et conviennent très bien de ce fait à la recherche des hématozoaires.

Ed. Lesne, P. Brodin, et F. Saint Girons.—Auto-plasmotherapy of Influenza.

Si l'on injecte à un grippé son propre plasma on observe des effets identiques à ceux que suivent l'injection intra-veineuse de plasma de convalescent, ou de plasma normal: c'est à dire, une réaction assez vive suivie généralement d'une défervescence ou passagère ou définitive. L'autoplasma ne semble pas avoir d'action spécifique; il agit comme une albumine étrangère. Il ne détermine pas d'accidents sériques à distance; il est peu toxique et n'est pas anaphylactisant.

G. Marinesco.—Oxidases and Peroxidases of the Tissues.

A mesure que le cytoplasma se développe, le fer diminue dans le noyau et augmente dans le protoplasma. Les images obtenues par la méthode de Nissl et par celle de Perls se superposent. Dans la chromatolyse qui n'est autre qu'un changement de la réaction du milieu, le fer est attaché aux granulations colloïdales. Le fer joue sans doute le rôle d'un catalysateur qui accélère les oxydations de la cellule nerveuse et de la myéline si riche en lécithine. En employant monochlorohydrate de benzidine et de l'eau oxygénée neutre, nous avons constaté la réaction des peroxydases dans les centres nerveux, le rein, les muscles, &c.

J. du Castel et M. Dufour.—Shock following Colloid Gold Injection:—

Avant le frisson, le choc s'inscrit sur les courbes de la température, du pouls, de la respiration et des pressions, il est plus accentué quand l'injection est faite au cours d'une variation thermique qu'en température fixe; en faisant dans la journée une deuxième et même une troisième piqure, certains auteurs ont obtenus des résultats favorables, plus favorables au début de la maladie, qu' à sa période terminale. Au total, le choc est toujours minime.

J. Chaussin.—Digestion of Miller's Offals by Dog and Rabbit:—

Le lapin digère environ 75 per cent. du son meunier alors que le chien en digère seulement 50 per cent. Les résidus du son ayant traversé le tube digestif sont peu déminéralisés chez le lapin et beaucoup plus chez le chien, ce qui fait penser à la différence d'acidité de leurs sucs digestifs. Les résidus du son ayant traversé le tube digestif du chien sont plus appauvris en azote s'il s'agit du son meunier, qu' avec des enveloppes de blé entières obtenues par simple écrasement du blé après trempage dans l'eau, qui n'ont pas subi les traumatismes des opérations de meunerie. Des expériences antérieures en collaboration avec M. Lapicque ont montré que l'homme digère les enveloppes de blé, à peu près comme le chien.

NORTH OF ENGLAND TUBERCULOSIS SOCIETY.—At a special meeting of this society held on March 20th at 1, Ridley-villas, Newcastle-upon-Tyne, to discuss the formation of a tuberculosis service on the lines suggested at the special conference held by the Tuberculosis Society in London on Feb. 15th[1] the following resolutions were passed:—

1. That in the opinion of this society the formation of a separate tuberculosis service is not advisable.
2. That the whole question of the status and conditions of service of those members of the Public Health Service who are at present engaged in tuberculosis work be referred to the Society of Medical Officers of Health for early consideration and necessary action.

It was resolved further to take steps to bring these resolutions to the notice of those concerned.

[1] THE LANCET, 1919, i., 310.

Reviews and Notices of Books.

Annals of Medical History. Vol. I., No. 4. 1917. New York: Paul B. Hoeber. Pp. 107 and Index. $2.

THE number now before us completes the first volume of this excellent publication, and, as our notice of it may at first sight seem rather belated, we hasten to add that it was not published until November, 1918, and we did not receive it until Feb. 5th, 1919. The study of medical history has of recent years taken vast strides forward, and our brethren on the other side of the Atlantic are in no way behind us in their wish to interpret and to absorb the spirit and mental outlook of our forefathers. The history of medicine, or rather of disease, reaches back to a period far anterior to that of any political history—i.e., the history of men living in community. These latter date back, as in the case of Egypt and the Minoan civilisations, to the comparatively modern date of 4000 to 3000 B.C., whereas the history of disease, as exemplified by its traces, goes back to Permian times—perhaps some 15,000,000 years ago, but physicists and biologists agree to differ about these infinite reaches of time. The evidences for this statement are set forth in a most interesting paper by Dr. R. L. Moodie, of the University of Illinois College of Medicine, entitled "Studies in Palæopathology." Another remarkable paper is one on Plague Tractates, dealing with the treatise of John of Burgundy on the Plague of 1348, generally known as the Black Death, and with the evidence for considering the writer as identical with the author of Sir John Mandeville's "Travels." This paper is by Dorothea Waley Singer and Reuben Levy, of Oxford. Colonel Owen, U.S. Army, Curator of the Army Medical Museum at Washington, concludes his illuminating report of the Medical Department of the United States Army during the revolutionary period, 1776–86. We note that the apothecary was more important than the surgeon, at least, if we may judge by their respective pay. Thus, in 1782, the hospital surgeon's pay was 96 and five-sixths dollars per month, two rations for himself and servant, forage for two horses, and 15 dollars per month subsistence. The apothecary, on the other hand, got 105 dollars per month, one ration and forage for one horse, and 15 dollars per month subsistence.

Simple Beginnings in the Training of Mentally Defective Children. By MARGARET MACDOWELL. London: Local Government Press Co. (R. T. Leach). 1919. Pp. 116. 3*s.* 6*d.*

THIS is a short, practical book in which Miss Margaret Macdowell describes her methods of educating small children of a very inferior mental type, such as Mongolian and microcephalic idiots. In 1913, after the passing of the Mental Deficiency Act, Miss Macdowell says that she felt that she could not work under the inspection of those who might possibly be unsympathetic, and she decided to retire and live with only a few children somewhere in the recesses of the country. She appeals for individual treatment and study of each child, the utmost perseverence, patience, and sympathy being necessary in the presence of numerous disappointments. A detailed account is given in a practical manner of the way in which she teaches the children to be clean in their habits, to feed themselves (some being ignorant of how to masticate), and to dress themselves. Other subjects dealt with include reading and writing, prevention of bad habits, industrial lessons, boot cleaning and knife cleaning, sewing, cooking, washing and ironing, physical education by means of walking, rhythmic dances, music, games, gardening, &c. In the appendix is given a list of the equipment necessary for a school for low grade defectives, together with a set of four weekly time-tables suitable for children at the different stages of training into which she suggests they may be divided.

Income Tax (Consolidation) Act, 1918. With Index, Tables, and Information. London: Stevens and Sons, Ltd.; Edinburgh: W. Green and Son, Ltd. 7*s.* 6*d.* net.

THIS is a re-issue with much new valuable matter added. The commencement of the Act is April 6th of this year. The new Act is, in fact, all the previous Acts rearranged and consolidated into a code. It entirely supersedes all the previous Acts, all of which are repealed. The new Act is therefore necessarily very voluminous; it extends to nearly 250 pages. As officially issued, it has the great advantage of large type but the great disadvantage of no index, and without an index a volume of that size is very inconvenient for consultation. In this issue the advantage of the large type is preserved, for it is the official print of the Act that is supplied and the larger paged and more boldly printed of the two official copies. To that there is added an exhaustive index running to over 30 pages of double-column matter. Further, in this new issue there are nearly 20 pages of tabular and other matter obviously designed, and well calculated, to assist all classes of people in handling income-tax and super-tax matters. The new pages include numerous tables of rates of tax, abatements and allowances, expert advice on these and other matters, instructions as to over 40 repayment claims, and a table of references tracing back each section of the new Act to the old sections now displaced.

The book is certainly most useful and in many quarters it must prove indispensable.

JOURNALS.

The American Review of Tuberculosis. Baltimore: National Association for the Study and Prevention of Tuberculosis. 35 cents.—The December number includes several technical papers indicating much laborious spade-work, but there is little outcome of that work, at any rate for the present. Dr. H. J. Corper records observations, mainly negative, of the effects of the X rays, benzene, thorium X, tuberculin, ether, and chloroform on tuberculosis in the guinea-pig.—Another inconclusive paper is an account of the transfusion of tuberculous sheep with the blood of normal and immunised sheep. The authors, Dr. E. Mayer and Dr. D. J. Hurley, find that repeated transfusion of normal blood may be of slight value, and that of blood containing antibodies may be of considerable value to the tuberculous mammal. But they accompany this finding with the reservation that differences in individual resistance in the same species may alone account for the different reactions observed.—Dr. D. R. Lyman's paper on the fate of the patient after discharge from a sanatorium is less gloomy than most essays on this topic. To his inquiry, "Has the fact that you have been at a sanatorium given rise to any unpleasant experiences with your neighbours or fellow employers?" he got 633 answers from ex-patients. Of these, 590 had no complaint to make on this score, and the trouble experienced by the remaining 43 was in several cases trivial. A more serious after-care difficulty is to keep the family doctor in touch with patients who "judge the value of the general practitioner in the after-care of tuberculosis by his record as an early diagnostician of the disease." On the other hand, the work of the visiting nurse comes in for generous praise from the author.

Carry On. Vol. I., No. 5, January, 1919.—This magazine is devoted to the reconstruction of the disabled United States soldier and sailor; it is edited from the office of the Surgeon-General, U.S. Army, and published by the American Red Cross. Much of the information is conveyed by photographs with explanatory text beneath, showing disabled men being cared for and in the course of training; these are scattered throughout the magazine and bear only a general relation to the adjoining text. As the articles are almost all of a general nature, written to encourage the disabled man to bear with his lot and to take up training, this arrangement of text and illustrations forms an excellent combination of the general and particular. An interesting article is contributed by Mr. W. A. Rogers, one of the leading cartoonists of the country, who in the midst of a Presidential campaign sustained a severe fracture of the right humerus and scapula. A short time before he had read with great interest a book describing how the impressions we receive from the outside world are converted into actions. Knowing that the centres of impulse, educated by years of practice, were still normal, and having faith in the power of intense will to carry the brain impulse through an unaccustomed channel he was able even before the fracture was set to commence working at a cartoon with his left hand. Copies of two cartoons, one drawn just before, the other just after the accident, show equal workmanship. At first his left hand rapidly became tired and the movements of the pencil jerky and unreliable, but practice soon overcame this trouble. Sometimes lines intended to go to the right started off to the left; this difficulty continued throughout the six weeks he was unable to use his right hand.

LITERARY INTELLIGENCE.—Mr. Henry Kimpton will shortly publish new editions of Hare's "Therapeutics" and Whitman's "Orthopædic Surgery."

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, PROFESSOR OF PATHOLOGY AND THERAPEUTICS IN THE UNIVERSITY OF PARIS.

AND

Dr. CHARLES FLANDIN, D.S.O., MÉDECIN-MAJOR DE 2ME CLASSE; CHEF DE CLINIQUE À LA FACULTÉ DE PARIS.

NERVOUS COMPLICATIONS OF EXANTHEMATIC TYPHUS.

BY A. DEVAUX,

FORMERLY INTERNE OF THE PARIS HOSPITALS; MÉDECIN-MAJOR DE 2ME CLASSE.

THE epidemic of exanthematic typhus which occurred with such severity in Roumania during the winters of 1916–17 and 1917–18 gave us an opportunity of observing a large number of nervous troubles in direct relation with this infection. This study of post-exanthematic nervous complications rests on the observation of a very large number of patients examined in the course of the Roumanian epidemic. The figures reported are based exclusively on patients who were in hospital at the neurological centre of Jassy during a period of seven months. In other Roumanian hospitals, and in the routine work of medical boards, we had frequent opportunities of seeing numerous patients attacked by nervous complications in all points comparable to those whom we have described.

Neurotropism of the Exanthematic Virus.

It follows from our findings that the infective agent, still unknown, has a very particular predilection for the nervous tissues. It produces in them more or less grave disorders, the clinical manifestations of which appear from the first days of the illness onwards, and often persist during the whole course of convalescence. Vomiting of cerebral type, extremely intense headache, constipation, transient ocular paralysis, photophobia, the characteristic position in bed, the state of torpor or prostration, and the mental excitement with sudden impulses, these and other symptoms may, before the appearance of the characteristic eruption, form a complex likely to be mistaken for acute meningitis by the observer not forewarned of epidemic disease. The subsequent course of the disease shows that, apart from the constant meningeal reaction, the centres and the peripheral nerves are not spared. This neurotropism of the exanthematic virus appears to dominate the whole picture of petechial typhus. If we compare the number and the gravity of the complications which involve the heart, the kidneys, the liver, the parotid glands, and other organs with those attacking the nervous system the importance of the latter is manifest. It may be said that, except for the benign forms observed at the decline of the epidemic, there are few typhus patients who do not present, either during the febrile period or during convalescence, some more or less grave and persistent trouble, indicating an involvement of the central nervous system or the peripheral nerves.

A study of the cerebro-spinal fluid, to which we were the first[1] to draw attention, confirms this idea. Cytological examination reveals the early occurrence and constancy of the leucocytic reaction, with a definite order of appearance, its persistence over a period varying from 2 to 8–10 months, and covering, it may be, the whole duration of complications. This formula, which, as we have noted, follows an orderly sequence, may be expressed schematically thus:—

During the first week 10–12 macrolymphocytes to a field, 4–5 mononuclears, without any degenerative forms, 1 polynuclear every 2–3 fields. During the second septenary 10–12 mononuclears, of which some are in process of disintegration, diminution of the lymphocytes, increase of polynuclears in proportion to the gravity of the prognosis. At the end of the third septenary rapid diminution of the mononuclears, with extreme predominance of the disintegrated forms and persistence of the microlymphocytes.

The Nature of the Nervous Complications.

The nervous complications may appear at the beginning of the attack. These are the delirious forms characterised by great motor disturbance, violent seizures, convulsive crises, either generalised or of Jacksonian type, monoplegias or hemiplegias, terminating rapidly in death. Necropsy shows in the majority of these cases, alongside intense hyperæmia of the meninges and plexuses, extensive meningeal or central hæmorrhages. Danielopol has reported a very instructive example.

Bulbar localisation, with labio-glosso-laryngeal paralyses, pursuing a fatal course, have been noted, more especially in the second week. Slatineanu has insisted on their gravity and frequence. Hemiplegias following on abscesses, hæmorrhages, foci of softening, appear later. But the phase of the disease which is most rich in sequelæ or in nervous complications is the period of convalescence, when, fever having abated, the patient appears to be out of danger.

The clinical forms are numerous and varied. In the central service of neurology under our direction at Jassy we collected during a period of seven months 215 observations, which we here classify:—

110 organic lesions ... ...
- 59 polyneuritis.
- 46 hemiplegia.
- 5 cerebellar syndrome.

70 functional disturbances
- 27 difficulty in walking.
- 15 functional monoplegia.
- 8 deaf-mutism.
- 15 functional tremor.
- 4 camptocormia.
- 1 amaurosis.

28 asthenias with various forms of algia and emotional trouble.

5 psychic disorders with mental enfeeblement.

2 anterior organic affections aggravated by typhus.

Neuritis.

Various forms of neuritis account for a quarter of the total number of post-exanthematic nervous complications. Sometimes making their first appearance before the critical fall of temperature, they appear most often during the first days of apyrexia. In other cases a week or two elapse after the disappearance of the infective symptoms and the general condition has begun to improve before the patient complains of tingling or lancinating pains in a limb or in a segment of a limb, which in a short time becomes paralysed.

Polyneuritis (24 cases) is much more frequent than the form localised to a single nerve trunk (median, 1 case; ulnar, 2 cases; radial, 2 cases; external popliteal, 1 case). All the muscles concerned with external movement may be attacked (generalised form, 3 cases).

In the upper limb (17 cases) the most frequent type is realised by a lesion of the posterior branches of the brachial plexus, in which supra- and infra-spinatus, the subscapularis, serratus magnus, and deltoid are involved. This

[1] Devaux, Paullian, and Tupa: Société Médicale du Front Franco-Roumain, Jassy, 1917. Devaux: Bulletin de l'Académie de Médecine de Paris, August 28th, 1918.

localisation does not seem to have been noted with such frequency in any other infection.

In the lower limb it is principally the external and internal popliteal nerves that are attacked (12 cases), selecting especially the motor functions of the former and the sensory functions of the latter.

Post-exanthematic neuritis begins as a rule with subjective disturbances of sensation. These include lancinating pains, tingling along the nerve trunks or in the muscular masses. Increased by pressure and by changes of temperature, these painful phenomena may persist throughout the whole course of the illness and dominate the clinical picture, leaving in the background the motor and trophic disturbances. In other cases paralyses appear suddenly; certain patients, recovering consciousness after the febrile period, remark loss of power in a limb. These paralyses are accompanied by the abolition of tendon reflexes, by rapid muscular atrophy, and modification of electrical excitability (partial R.D.). Whereas in the painful form in which deficiency of muscular power is less marked, an objective study of sensation shows over the areas of cutaneous sensory distribution a hyperæsthesia of all kinds; in the form with paralysis and atrophy there is usually anæsthesia or hypoæsthesia, both superficial and deep.

Painful sensory disorders may persist for a very long time. They show marked predilection for the plantar regions. A large number of convalescents retain for some months cutting and pricking sensations, or troublesome painful numbness of the plantar surface of the feet, more especially at the base of the toes. This continuous pain is deep and difficult to localise exactly; it is increased by changes of temperature, shocks, and fatigue; it makes walking very painful, sometimes even impossible without support. At the end of several months a phase of remission may occur; afterwards without apparent reason the painful phenomena recur, and oblige the patient to take up again, for a more or less long time, his hesitating cautious gait, avoiding with care the unevennesses of the ground. We have come across old exanthematics who, a year after their infection, retained these painful phenomena, against which all treatment appeared powerless.

The prognosis of post-exanthematic polyneuritis is very good. Apart from the painful paræsthesias of the sole of the foot, which last for months or even for years, the motor and sensory symptoms disappear at the end of 4–6 months. The three generalised cases, which we have observed, recovered after five months' stay in hospital.

Hemiplegia.

We have already mentioned the gravity of the hemiplegias of the febrile period. Those which appear in the course of convalescence, without being uniformly fatal, are nevertheless very grave. They may appear with the critical fall of temperature, but much more often it is after a week or sometimes after a month that they come on. It seems that the cases with marked cerebral torpor, or very pronounced motor disturbance in the course of pyrexia, are peculiarly liable to the occurrence of the hemiplegic syndrome. Nearly always fatal, this often is sudden in onset, with or without convulsion, at other times coming on in successive stages, gradually reaching complete loss of power of movement in one half of the body. The symptomatology does not offer any peculiar character. After a more or less long phase of flaccidity, spastic phenomena appear and the patient presents the classical picture of organic hemiplegia. Death is a frequent termination. It supervenes in a number of cases towards the end of the first month, caused either by a new seizure or by progressive cachexia with bedsores. At the necropsy we have encountered two kinds of lesions: either a large central abscess (2 cases), or extensive foci of cortical softening (12 cases).

Cerebellar Syndromes.

The cerebellar syndromes noted in our statistics appeared apart from any involvement of the auditory apparatus. Hearing is frequently affected in convalescence from petechial typhus, and then often as a complication of cerebellar abscesses. But the relation of auditory disturbances with exanthematic infection is much more remote, and they only arise through the medium of otitis or mastoiditis. In the case of two patients in whom the cerebellar syndrome was manifested immediately after the critical fall of temperature and occasioned death after three weeks, we were able to verify the anatomical lesion, which consisted of a focus of softening in one of the lobes of the cerebellum.

Functional Disturbances.

Amongst functional disturbances, hysterical phenomena hold a very important place, occurring in greater number than polyneuritis. Exanthematic infection leaves the patients in an exhausted condition in which the phenomena of auto-suggestion find a terrain peculiarly favourable to their spread. In the minds of patients whom we observed, the idea of a very grave illness which they had just escaped gave place to a conviction that they must maintain an incurable infirmity. The very marked emaciation of all muscular masses, the stiffness of the joints due to prolonged lying, the difficulty of making the least movement, and the fatigue resulting from it, the many fugitive algias and pains following slight neuritis: all these form in debilitated subjects the starting point for auto-suggestion, which ends rapidly in paralysis of a limb or suppression of a function. These troubles usually appear 7 or 8 days after defervescence. They attack with marked predilection the lower limbs, and may be superimposed on the pains in the sole of the foot. The variety of clinical aspect is extreme. Contractures of extensors or of flexors are very numerous, and show themselves in peculiar limps and fantastic attitudes which yield rapidly to energetic psycho-therapeutic treatment. Flaccid paralyses are much less numerous and involve especially the upper limb. In the case of subjects in whom medical suggestion had not created sensory phenomena we did not note any zone of hyperæsthesia.

If tremors of hysterical nature are relatively frequent, affecting the most diverse regions and assuming the most various forms, there are others which present themselves with characters rendering the diagnosis from the tremors of disseminated sclerosis, of Parkinson's disease, or of general paralysis very difficult. The difficulty is increased by failure of psycho-therapeutic treatment. Absence of any other symptom of these affections, occurrence of tremor after acute infection, and, above all, progressive recovery occurring spontaneously after 2–3 months, are factors which may throw light, if not upon the pathology, at all events upon the gravity, of the symptom.

Neurasthenia.

The exhausted condition of fatiguability in which these patients find themselves after the acute phase generally disappears rapidly. With substantial nourishment these convalescents, whose appetite appears insatiable, regain their weight and recover their strength. But in many of them, notwithstanding an excellent general appearance, without any visceral complication (and, in particular, without any sign of suprarenal insufficiency), a very pronounced condition of asthenia persists. Such patients are incapable of undergoing the slightest fatigue, even the least effort is impossible to them; very frequently they complain of persistent headache preventing sleep; they complain of diffuse deep pain in the loins, more marked when standing or sitting, disappearing on certain days, to return later; or there are algias of variable distribution, more marked in the muscular masses, at the roots of the limbs, in the shoulders and calves, or interscapular region; others complain of cramps, sensations of deep spasm, bone pain, without precise localisation. Concurrently with these troublesome sensations, which correspond to no objective sign, these subjects complain of disturbances of memory, of the impossibility of fixing the attention or of doing any sustained intellectual work. This condition lasts a long while. It is only after 6–7 months at least that progressive improvement begins to appear.

Such neurasthenic conditions are very often accompanied by slight emotional disturbances. Sometimes the latter predominate. The patient presents the complex of physical and psychical symptoms which Dupré has grouped in his description of the emotional temperament, and which we have described with Logre in a study[2] on "The Anxious." This psychic upset of equilibrium, secondary to exanthematic typhus, is found in subjects hitherto free from

[2] Devaux and Logre: "Les Anxieux," Paris, 1918.

emotional tendency, and appears to be in strict relation with the infection.

Psychic Disorders.

Observations of mental enfeeblement are much more rare and follow on the very grave forms of typhus, which leave the patients in a condition of complete dementia, apathetic, indifferent, and depraved. One patient belonging to this category presented a paralysis of the internal rectus muscle of the left eye, the pupils unequal but not irregular, reacting badly to light. These physical signs accompanying a state of dementia gave rise to the suggestion of a progressive general paralysis, rendered more plausible in that the cerebro-spinal fluid—as is the rule in convalescents from exanthematic typhus—contained numerous mononuclears and lymphocytes, showing disintegration in a fairly large proportion. Bordet's reaction being negative in the blood and cerebro-spinal fluid, without conclusively deciding the diagnostic problem, was against general paralysis, the naturally rapid course of which would have resulted in complete dementia within three months.

Another example, almost analogous, but not giving rise to doubt, was furnished to us by a doctor who, after an attack of typhus of moderate intensity, retained the physical syndrome of general paralysis for three months. Along with a slowing of the faculty of memory, of which he complained, and was able to give a careful analysis, this patient presented a fine irregular tremor of the hands. The unequal and regular pupils reacted sluggishly to light, speech was disordered by a dysarthria in all points comparable to that of general paralysis; but this man retained his higher centres intact and did not present any sign of intellectual deficiency. He watched his own symptoms, noting the gradual return of memory and of speech, the pupils recovering their functions, the cerebro-spinal fluid, which during the first week contained numerous lymphocytes without increase of albumin, taking on again the normal content of white cells, recovery becoming complete at the end of five months.

The microscopic lesions were not studied, this being a subject to which we propose to return later.

NOTE ON THE EPIDEMIC DISEASES OBSERVED IN ROUMANIA DURING THE CAMPAIGN OF 1916–17.

BY DR. HENRI VUILLET,

LATE INTERNE OF THE PARIS HOSPITALS.

DURING the autumn of 1916 the Roumanian Army and population were in such a defective condition of hygiene that the occurrence of great epidemics was inevitable.

During the month of November *cholera* made its appearance in many places. Notwithstanding the gravity of the cases observed, the malady did little damage relatively; there were, at most, some hundreds of victims. This result must be attributed, on the one hand, to the numerous bacteriological examinations permitting the isolation of germ carriers and, on the other hand, to a vigorous campaign of anticholera vaccination, made according to the method which already, in 1913, had preserved the country from disaster.

Nearly at the same time an epidemic of *recurrent fever* developed. This malady, whose first appearance it was in Roumania, showed its well-known clinical characters; we must note, however, the very high proportion of fatal cases, which reached approximately 8 to 10 per cent. without anything being able to explain the peculiar gravity of the infection; vigorous subjects were no more often spared than those whose general condition left something to be desired. Death usually supervened at the beginning of the second attack. Intravenous injections of neosalvarsan, even in large doses, appeared to be of doubtful efficacy in the grave forms. We may add that among the patients who recovered from recurrent fever many subsequently were attacked by tuberculosis under different forms (acute pulmonary infiltration, Pott's disease, &c.).

We must record, also, epidemics of variola, typhoid and paratyphoid fevers, and a benign infective jaundice, which was very prevalent in 1917; but these maladies ran their course without any special characteristics.

Exanthematic Typhus: Symptomatology.

Exanthematic typhus had consequences incomparably more grave than the maladies of which we have just spoken. It was not until the beginning of December that some cases were recognised occurring with the characteristic eruption.

It is difficult to state precisely the origin of the epidemics Was it brought from Hungary or from Transylvania by the Roumanian troops which had invaded these countries, or was it carried into Roumania by the Russian Army? The two hypotheses are equally reasonable, and it is not impossible that there may have been many means of simultaneous introduction from different sources. However it may be, there was a rapid extension of the epidemic, as is the rule in unfortunate military circumstances, with general misery prevalent. During the first weeks of the epidemic its gravity was comparatively slight, nearly all the patients recovering, although at the beginning they showed considerable hyperpyrexia and alarming general symptoms. But as the cases multiplied the virulence became greater.

There are, in classical works, excellent descriptions of exanthematic typhus, setting out the facts observed in different countries and at different epochs. In reading the literature it strikes one that the authors do not always give exactly similar clinical pictures, proving, beyond doubt, that any epidemic may assume a special physiognomy. For example, the typhus studied in Morocco and in Tunis does not appear identical with that which has developed in Eastern Europe during these last years. With regard to these symptomatic differences in form, it appears to us that the ethnological characteristics of the patient do not produce a special type of disease; we are concerned rather with that special factor, vague enough in its meaning, but the existence of which is indisputable, which the doctors of old called "the génie épidémique."

In Roumania, during the epidemic of typhus now being noted, true cardiac complications were extremely rare. But the importance and frequency of nervous symptoms were striking. Nearly always the infection manifested itself at first as an acute meningitis (cephalalgia, contractures, Kernig's sign, constipation); presently, after a more or less long time, perhaps about a week, the nervous troubles disappear progressively; sometimes, on the contrary, the impression is given that the higher regions of the nervous system are more profoundly affected (infection or intoxication)—delirium becomes marked, myosis is apparent, dysphagia, trismus, and inability to protrude the tongue beyond the dental arches. Finally, the pulse becomes accelerated and the dyspnœa urgent, as in the terminal period of grave pulmonary complications, whilst stethoscopic signs are non-existent or only slightly marked. In the course of the Roumanian epidemic the bulbar, or rather bulbo-cerebral, form was extremely frequent, and, save in very rare exceptions, meant a fatal prognosis. At the autopsy the brain showed congestion and diffuse œdema, dropsy of the ventricles; the lungs and heart usually appeared normal.[1]

Late Complications: Effect of Efficient Attention.

We need only to point here to the late nervous and sensory complications of exanthematic typhus: divers types of paralyses, modifications of sensation, troubles of the visual apparatus, and so on were noted. These symptoms deserve prolonged study; they are, fortunately, fairly rare and appear to be the result of the original damage to the nervous system by the typhus virus. Much more frequent are the cases in which one sees, added to exanthematic typhus, and developing with characteristics more or less pronounced, a

[1] We are indebted to Dr. Devaux for the study of the cerebro-spinal fluid in the course of exanthematic typhus. This fluid is never purulent, but in the early stages of the disease it shows usually a large proportion of polynuclears; the cytological formula is modified as the infection evolves, and in certain cases allows the establishment of a prognosis.

streptococcal infection. The microbe produces a good number of complications, often formidable, which have been observed during the first three or four weeks following the beginning of the malady, mumps (infection of the parotid gland), otitis media, erysipelas, adenitis, and abscess, frequently localised in the cervico-facial region. Except in the cerebro-bulbar form, of which we have just spoken, it is to these complications that most of the deaths are due. We have seen many times erysipelas causing the death of a typhus patient in the space of two or three days. Account must be taken of the importance of small attentions constantly repeated; cleanliness of the skin, disinfection with appropriate antiseptics of the mouth, the nasal cavities, the auditory canal, and the conjunctivæ. We are convinced that the zeal and experience of nurses applying these elementary details of hospital hygiene will produce results remarkable in a malady in which therapeutics are nearly ineffectual.

Numberless were the medicaments and methods of treatment employed in the course of the epidemic which we witnessed, but not one of these therapeutic agents has shown any specific activity. From this point of view, in order to guard against any illusion, it is well to recall that at the beginning and at the end of an epidemic the mortality is nearly nil, whatever the treatment may have been, and even without anything having been done except symptomatic treatment of the most simple description.

Prophylaxis.

In order to discover the microbic agent of exanthematic typhus very numerous investigations have been carried out in Roumania during the last two years, but like previous researches they remained without result. But the facts adduced some years ago by Charles Nicolle and his collaborators have established the rôle of lice as intermediary hosts and agents in the transmission of the virus. This ætiological fact is now indisputable; it has resulted in well-known rules of prophylaxis, whose efficiency is perfect when circumstances permit their rigorous application—for instance, in the course of a small epidemic and in a country where the conditions of social and economic life are normal.

It is otherwise when the epidemic develops rapidly on account of the great displacement of the civil and military population and when resources of all kinds are deficient, as occurred in Moldavia in the winter of 1916–17. The men whom it was desired to educate in order to employ them in the work of disinfestation contracted the disease before they could be of service. Very severe cold, the lack of coal, wood, and petrol, and sometimes the lack of water, rendered the task particularly difficult. There was, however, no lack of perseverance shown. The efforts and sacrifices of the medical corps and of the sanitary personnel were such that, notwithstanding the deplorable conditions in which they worked, prophylaxis was in the end successfully secured.

The patients blocked not only the regular hospitals, but also all the public institutions (almshouses, schools, seminaries, monasteries, &c.), which had to be hastily transformed.[2] In each hospital centre a service of disinfestation (*deparasitation*) was installed where the patients, before being admitted to the rooms, were shaved, bathed, douched, rubbed with petrol, and otherwise treated for the destruction of nits. For the disinfection of clothing, linen, bedclothes, &c., we had to be content with the use of steam chambers, but there were too few of these, only the large hospitals possessing them. The employment of sulphur chambers was not without some inconveniences, while the great drawback was that sulphur could only be obtained in very small quantities. We found it more practical and more economic to construct simple underground ovens where whatever had to be disinfected could be easily brought to a temperature sufficient to destroy the parasites and their eggs. As there was a lack of high scale thermometers, it was a delicate point to calculate this temperature; but we succeeded by employing very simple indicators, consisting of glass tubes in each of which was placed a tablet of aspirin, for it is known that this substance is fusible at 130°.

[2] Later it was possible to construct barracks, but when the epidemic started the manual labour and the materials were totally deficient.

At the same time it was proposed to extend prophylaxis beyond the central and urban hospitals.[3] From the time when the military operations slackened and the troops were settled in their winter quarters a complete system of methodical disinfection was organised. The soldiers who returned from the interior of the country, men on leave, and convalescents, were obliged to remain in the sanitary stations, where they were under observation for several days. In the army zone a large number of disinfestation posts were set up, each including a vapour bath, a douche bath, and an oven; some of these posts were installed near the trenches of the first line.

Finally, the rural population were not forgotten, they were made to benefit by practical hygienic measures as far as possible; but the difficulties which had to be surmounted can be imagined in a country where the population is very scattered and where means of organisation are of the most rudimentary description.

The epidemic of typhus commenced in December, 1916; it attained its maximum extension and gravity in the following March. At this time the mortality exceeded 50 per cent., after which matters improved. From the spring onwards and during the fine season typhus by degrees died out completely. At first the soldiers and the population of the towns suffered especially from the epidemic, which afterwards reached the country. In certain regions the ravages were such that villages were noted from which nearly the whole of the adult inhabitants had disappeared. It is very difficult to calculate exactly the number of victims.

[3] It is impossible to speak of this great sanitary work without naming him to whom accrues the principle merit—Dr. Jean Cantacuzène, Professor of Experimental Pathology at the University of Bucarest, who accepted in very critical circumstances the heavy charge of the Direction of Public Health.

The French Supplement to THE LANCET—under the Editorial Direction of Professor Charles Achard, Professor of Pathology and Therapeutics in the University of Paris; and Dr. Charles Flandin, D.S.O., Médecin-Major de 2me Classe; Chef de Clinique à la Faculté de Paris—has appeared on the dates given in the following list, which sets out the titles and authors of the contributions:—

Sept. 21st, 1918: (1) The Microbic Diversity of the Enteric Fevers, by Professor Achard. (2) Post-Typhoid Atony of the Cæcum, by Maurice Loeper, Professor in the Faculty of Medicine and Physician to the Paris Hospitals.

Oct. 19th, 1918: (1) What the War has Taught Us about Tetanus, by Louis Bazy. (2) Tetanus Consecutive to Superficial Wounds and to Trench Foot: Treatment and Prevention, by Professor Raymond, Médecin Principal de 2e Classe.

Nov. 30th, 1918: (1) General Review of French Cardio-Pathology during the War, by Ch. Laubry, Physician to the Paris Hospitals; Médecin Major de 2. Classe. (2) Methods of Estimating Augmentation in Depth of Volume of Left Ventricle, by Dr. Bordet, Director of the Radiological Laboratory of the Centre of Cardiology of Professor Vaquez, Hôpital St. Antoine.

Jan. 11th, 1919: (1) Gunshot Concussion of the Spinal Cord, by Henri Claude, Professor in the Paris Faculty of Medicine; Physician to the Paris Hospitals; and Jean Lhermitte, formerly Chef de Clinique in the Paris Faculty of Medicine. (2) Contribution to the Study of the Manifestations of Emotional Shock on the Battlefield, by Cl. Vincent, Physician to the Paris Hospitals; formerly Medical Officer to the 46th and 98th R.I. and to the 44th B.C.P.

March 1st, 1919: The Surgical Complications following Exanthematic Typhus, by Dr. Paul Moure and Dr. Etienne Sorrel, Prosectors to the Faculty of Medicine, Paris; Médecins Aide-Majors de 1. Classe; Surgeons to the French Hospital at Jassy.

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THE LANCET.

LONDON: SATURDAY, APRIL 5, 1919.

Reform of Medical Education.

IN his valuable report upon medical education[1] Sir GEORGE NEWMAN states in words to which we have already drawn attention in these columns that "We need throughout the medical curriculum, in the preliminary sciences and the intermediate and clinical subjects, an education of university standard not subservient to an examination system, but directed and inspired by competent leaders in each medical faculty ..... devoted to their high calling as teachers and investigators." This sentence epitomises the ideal of medical education which all advanced thinkers have before them, and at the same time reveals the great distance which has to be traversed before that ideal is reached and the numerous and serious difficulties which have to be overcome. In preliminary science, upon which alone the applied science of our calling can be founded, we have, to begin with, a great source of the wastefulness in time which marks our present educational course. The statutory curriculum of medical education is five years in duration; the actual curriculum is known to absorb nearer seven years than six, taking the average of all those whose names attain to position on the Medical Register. And a great part of that excessive time is spent either in the acquisition of preliminary science or in the failure to pass intermediate examinations dealing with applied science, because the earlier work has not been thoroughly mastered. This position has been so clear that a movement has long been in existence to relegate the whole of the preliminary scientific education of medical students to school life. If this principle were acted upon rigorously it would secure that the student on joining the medical school would have mastered the necessary chemistry, physics, and biology, and would proceed straight to the study of anatomy and physiology. This in its turn would mean that from the age, say of 16, for the next two years such a student must have received adequate education at school in these preliminary scientific subjects. We perceive at once that this method of reforming medical education, so as to obviate needless waste of time while leaving a proper period for the study of clinical subjects, must break down: there are not in the United Kingdom sufficient schools as yet to supply the necessary education, and such schools as there are, being situated in England, would give to the English student an unfair advantage over his Scottish and Irish brethren.

For the time being, at any rate, it will be necessary for the medical schools to educate their students in the sciences ancillary to medicine, and the medical schools, while taking on a university pattern, will have to meet the difficult situation by a due watchfulness over the introductory instruction in chemistry, physics, and biology. We cannot conceive that these subjects can be taught only with reference to a future knowledge of anatomy and physiology; such a descent from the general to the particular would nullify the instruction of the ablest teachers. But we do not think it should be beyond the ingenuity of men who are accustomed to give instruction in these subjects to arrive at a syllabus which should be satisfactory to other men, equally accustomed to give instruction in anatomy and physiology, and whose lot it will be to preside over the next step in the training. If the difficulty of instruction in preliminary sciences can be met in such practical manner more time will be left for the study of anatomy and physiology, and later for the clinical subjects. Here—that is, at the intermediate stage of the students' education—there would seem to be room for improvement both in the methods of instruction and in the methods of examination. The large percentage of rejections which occurs at this stage of medical education is not due to inherent faults on the part of medical students as a class, seeing that to-day they are notoriously among the hardest working and most diligent sections of every university faculty. The probability is that the knowledge required from them in anatomy and physiology is too diffuse and too particular. Following the same line of thought as was employed in dealing with instruction in chemistry, physics, and biology, we do not suggest that anatomy and physiology should be taught only with an eye on pathology—that is, on the clinical studies which will form the closing stage of the student's training. First, anatomy and physiology cannot be imparted as live sciences if instruction in them is to be defined in any such manner; but secondly, and more importantly, the student would not appreciate the pathological directions which his teaching was taking, seeing that he would still be in perfect ignorance of the phenomena of disease, and must remain so until he has access to the wards of a hospital. We would not have the time gained by simplification of the ancillary studies used to repair the time now wasted by the high percentage of rejections at the intermediate examinations; on the contrary, we believe that a double saving of time could be effected for use at the last, and without lowering the general standard of medical education or defaulting in any way from a university pattern, if competent examiners in the clinical subjects would confer with competent examiners in the intermediate subjects, so as to arrive at an organised scheme of training. Such conferences must lead to examination tests which would be at one and the same time general as regards the teaching of the sciences, economical in detail with as regards what is taught, and, thirdly, well directed to form the basis upon which clinical studies can arise, while implying no premature and empirical knowledge of therapeutics or pathology.

[1] THE LANCET, August 3rd, 1918, p. 147

Medical students thus trained soundly on general principles, and neither top heavy with meticulous details nor dashed in spirit by rejection in examinations, and having at least two years clear before them in which to acquire their clinical learning, would still have enough before them to fill every hour of every day. But the opinion is now general that systematic clinical teaching is required to an extent that was previously thought entirely unnecessary. "Walking the hospitals" was a very good description of a thing that can no longer count. It is here that the decision of the governors of the London Hospital to fill the vacancies on their honorary medical staff with whole-time paid officers is of such great significance. These medical officers, consisting in each case of a director and three clinical assistants, having a laboratory and clinical staff behind them, will be able to provide medical education at their clinical centre comparable to University methods as observed in other faculties. It is known that at St. Bartholomew's Hospital and at Guy's Hospital a similar practical and progressive step is about to be taken, and this week it is announced that the suit will be followed at University College Hospital. The Board of Education, from which already grants have been received by many medical schools, is prepared, we understand, to defray at least a proportion of the costs, and we have every reason to believe that the Minister's view of this proportion will be a generous one. Thus we can fairly anticipate that the ideal of medical education, outlined above, may shortly be realised in London. The real difficulty ahead is the selection of the whole-time officers.

Prophylactic Inoculation in Influenza.

CONVICTION grows that no drug has unquestionable success in the treatment of influenza, and that no such therapeutic intervention can in itself avert the development of the dreaded septicæmic or "pneumonic" type from the uncomplicated case in which recovery is the rule. The accumulated experience of medical officers who have been brought into contact with thousands of cases goes far to support the opinion that the success of certain drugs which have from time to time been approbated is more apparent than real, and is often presumed in circumstances where control cases would have shown otherwise. The question of specific treatment assumes therefore a position of special importance and is one to which, in the event of another outbreak of the epidemic, serious thought must be given. In the present issue of THE LANCET the subject of protective inoculation is critically considered by Dr. A. J. EAGLETON and Mr. H. H. BUTCHER, Captains, R.A.M.C., in relation with certain other therapeutic measures, and by Dr. JOHN EYRE and Dr. E. CRONIN LOWE, whose valuable investigations on prophylactic vaccination among the New Zealand troops in this country appeared in our columns on Oct. 12th last. From a survey of their results it appears that although inoculation by a mixed vaccine of *B. influenzæ*, *Pneumococcus*, *Streptococcus*, *Staph. aureus*, *M. catarrhalis*, *B. pneumoniæ*, and *B. septus* conferred no immunity to serious complications, yet the course of the disease was modified so that a lower mortality resulted in these severe cases.

The grounds for such an opinion demand careful scrutiny. The difficulty of assessing the value of inoculation is no less than in the case of any other therapeutic measure. The circumstance of recovery in an apparently hopeless case when a particular form of treatment has been adopted naturally inclines the uncritical observer to apportion the credit to the treatment. And such a biassed judgment remains until the recovery is witnessed of an equally "hopeless case" without any treatment whatever. The difficulty is still greater in the present circumstance, for the authors of the articles recommend the accompaniment of prophylactic vaccination by various other precautionary measures, the influence of which it is impossible to compute. But when all this is granted, it is still to inoculation that we must needs look for the hope of more favourable results in the complications of influenza. No doubt remains that it is the secondary infection associated with influenza which determines the occurrence of complications and the mortality of the disease. And the variability of this secondary infection must always constitute a serious difficulty in the preparation of an efficient vaccine. Thus the condition described as "purulent bronchitis" by HAMMOND, ROLLAND, and SHORE in France, and by ABRAHAMS, EYRE, HALLOWS, and FRENCH in this country, was of the nature of a primary influenzal infection—the *B. influenzæ* being demonstrated in a large proportion of the cases—followed by severe secondary symptoms due to the pneumococcus. On the other hand, the recent pandemic has assumed rather different characteristics, although certain cardinal features ally it to "purulent bronchitis," and the most important and devastating secondary organisms have been shown by many observers to be various species of streptococcus. In the papers under consideration the streptococcus is employed in the preparation of vaccines, and, as far as possible, varying strains have been included to yield a polyvalency. It is worth pointing out, however, that allusion is made only generally to "a streptococcus" or to a *Streptococcus longus* which may or may not signify the hæmolytic pyogenic coccus, and that no direct allusion is made to the various species of the *Streptococcus brevis*, which both in this country and on the continent has been regarded as of the greatest influence in the production of the septicæmic and toxæmic complications. These diplostreptococcal forms have been described by GRUBER, SCHÄDEL, BERNHARDT, and MEYER in Germany, by SEGALI in Italy, and by ABRAHAMS, HALLOWS, FRENCH, and others in this country. It might also be of some value to distinguish the more virulent types of pneumococcus from those of lesser pathogenicity, especially when dealing with cultures of these organisms derived from the sputum.

We would underline our conviction of the importance attaching to the question of prophylactic inoculation. It would seem desirable, in the event of another influenza epidemic, that steps should be taken to identify, with the least possible delay, the secondary organisms responsible for the severe complications, and to undertake wholesale inoculation with an appropriate vaccine. The writers of the articles in the present issue draw attention to the variability of the secondary organisms, and to this circumstance we have ourselves alluded in a reference to other papers. Not only are separate epidemics or separate waves of the same epidemic associated with different secondary infections, but the latter would appear to vary substantially during the progress of the epidemic. It must be of vital

importance, therefore, to maintain a continuous bacteriological surveillance and modify the character of the vaccine according as necessity arises during the course of the epidemic. The Research Department of a Ministry of Health would naturally undertake such a task.

The Pecuniary Position of Hospital Officers.

IN the spring of 1914 the Executive Committee of King Edward's Hospital Fund for London appointed a subcommittee to consider the question of pensions for hospital officers. The inquiry was held at the instance of the British Hospitals Association, who submitted to the subcommittee a statement of the difficult pecuniary position of hospital officers, meaning in the main the superintendents, managers, secretaries, nurses, and subsidiary male staffs; and the terms of reference were to inquire into and report as to the prevailing provision for pensions in the London voluntary hospitals, and to recommend changes or extensions of the existing arrangements. The inquiry undertaken by King Edward's Hospital Fund for London was limited to the metropolis, but the lessons emerging from the report will hold good, in the main, for the rest of the country. It should be added that the inquiry was welcomed by the London hospitals, which institutions were consulted by circular letter in order to ascertain their views. The replies to the circular letter indicated, for one thing, that any practicable suggestions for getting over the difficulties in the way of securing pensions, particularly in the case of medium-sized hospitals, will receive the sympathetic consideration of the authorities.

The subcommittee consisted of Mr. W. J. H. WHITTALL, Fellow of the Institute of Actuaries, Mr. H. L. HOPKINSON, and Sir WILLIAM J. COLLINS, making a small but very competent jury to sift and collate the evidence and return the verdict. The report, which has now been issued, investigates fully the difficulties that arise in providing pensions in the case of hospitals, difficulties which are specially indicated by such provision as at present exists at certain of the institutions. While the principle of pensions for hospital officers is generally recognised, and while at a few hospitals there are schemes in force, there is no regular pattern for making such provision, individual cases being frequently treated as requiring a special act of the managing authorities. This sporadic form of generosity has its advantages, but the drawbacks are greater. Too wide an opening is thus given to the influences of favour, personality, and chance; an orderly scheme will always leave room for hard cases, but on the whole justice is done. Moreover, no special acts of benevolence would ever meet the case of a transfer of services from one hospital to another; and, indeed, in the course of the inquiry it became evident that migration under all existing schemes involved the loss of claim to pension resulting from years of service at the first hospital. This is a position which should certainly be remedied, for only with reasonable opportunity for migration can the stimulus to work be obtained which follows upon promotion to greater responsibility. On general grounds the grant of pensions to superior officers, it is stated, would derange the finances of institutions which exist for the dispensation of public charity; but with this matter the subcommittee deals clearly when stating that the objection to the gift of money subscribed to hospitals for the treatment of the sick poor being used in the grant of pensions, is based on a confusion of ideas. "The grant of a pension," they say, "is not an act of charity involving a diversion of the funds of the hospital from the particular charitable purposes for which they were given, ... it is the method of paying to an officer a certain portion of the remuneration which he has earned, and the payment of which is part of the ordinary expenses of carrying on the work." The report definitely establishes the fact that those who know the circumstances and conditions of hospital service feel the necessity of reinforcing the position of hospital officers by the provision of an adequate pension scheme.

The report analyses the schemes that exist for the granting of pensions in the six London hospitals where such schemes are in operation, later discussing the position at the 99 London hospitals which have no such scheme. The six with general pension schemes are St. Bartholomew's, the London, Guy's, Middlesex, St. George's, and the Cancer Hospital, all of which large institutions have endowments, though the charities benefit to a very variable extent by such private incomes, and two at least of the six are far from wealthy. The pensions in the schemes of all six institutions are calculated, it appears, on the Civil Service pattern laid down by the Superannuation Act; they are non-contributory, and are arrived at by taking a certain fraction of the final salary for each year of service up to a maximum of two-thirds of the final salary. Dealing with the hospitals without schemes, the subcommittee classifies the pensions paid in 1913 to the total staffs, salaried staffs, and weekly-wage staffs, when it is at once seen that in the 99 hospitals without schemes only seven salaried officers retired from age, and those officers received on the average less than one-seventieth of the salary for each year of service, as against the proportion of nearly one-fiftieth in the hospitals where pension schemes are in operation. The deduction is obvious that men and women who are past their work may remain in harness in default of a certain pecuniary future. The provision for pensions in the London hospitals possessing no definite schemes is of the most various sorts, and the subcommittee endeavours to analyse and correlate all the methods, classifying them according to the plans of financial provision, and applying the information thus brought together and analysed, to answer the fundamental questions. Their final recommendation is that a joint conference of hospital representatives should be invited to consider the whole question of a scheme "based upon recourse to insurance companies." They reject "the mutual principle" unless a sufficient financial guarantee can be provided outside the mutual fund; and this the hospitals are unable to do. They recommend that in addition to the hospital staffs and officers, care should be taken that the nursing staffs and weekly-wage class are separately represented, and that experimental calculations should be based on a 10 per cent. contribution, each party to the pensions scheme paying 5 per cent. Such a scheme, of course, would be obligatory upon all accepting new appointments. In cases of existing staffs a similar total contribution would have to be made on mutually agreed terms for each year of future service, a procedure which would greatly reduce the cost of private

pensions in arrear. The subcommittee recommend that, in order to raise the status of hospital service, every year of work should command a vested right to pension, so that the benefits of any existing policy would follow the officer either on withdrawal generally or on migration.

This is the general recommendation of the subcommittee, but in a dissentient memorandum Sir WILLIAM COLLINS finds himself unable to concur in the conclusion that a scheme based on a recourse to insurance companies is the only possible solution of the problem, for he considers that the conference of hospital representatives, which should follow upon the report, should have before it not only the plan based upon the methods of insurance companies, but the various alternatives presented in the report, such as the Civil Service and other State service patterns, the pattern adopted by the police and the asylums officers, and the schemes of great railway companies, where, for the most part, the amount of the pension depends upon the officer's future salary. The whole report is a most valuable document, because it brings within the covers of a readable book the causes and details of much financial disorder and much injustice known to exist in the management of great charities, and known, moreover, to exist there to the extreme dissatisfaction of all the authorities concerned. Everyone is aware that hospital officers deserve pensions; the result of this close investigation of the circumstances should be prompt reform.

Annotations.

"Ne quid nimis."

THE LYMPHOID TISSUES, TUBERCULOSIS, AND SUNLIGHT.

THE greater part of the January number of the *Journal of Experimental Medicine* is taken up by records of very suggestive experimental work upon the activity of the lymphoid tissues in the body. Their study has in the past been difficult on account of the lack of methods of approaching the subject. The wide distribution of the lymphoid tissue throughout the body has prevented observations comparable to those adopted in investigating the functions of the internal secretions. Owing to rapid hyperplasia of the lymphoid tissues, compensation for loss, such as can be induced by splenectomy for example, so readily occurs that lessened function cannot be detected. Dr. J. B. Murphy and his co-workers have found, however, that practically the entire lymphoid tissues of the body can be destroyed without any noticeable effect upon the health of the animal by means of small repeated doses of X rays. There result important changes: there is a lessening of the mechanism of resistance to implant of foreign tissue, to inoculated cancer, to grafts, tuberculosis, and to poliomyelitis in various animals; and it is suggested that the lymphocyte is an active agent in these processes. The present experiments have been directed to the study of the converse conditions—namely, those by which the activity of the lymphoid tissues can be increased. It is found that one of the most effective means of inducing such increase is by dry heat. Animals subjected to dry heat (55–65° C. for mice, 60° for rats and guinea-pigs) for short periods showed, after a sharp preliminary fall, a subsequent gradual increase of both the polymorphonuclear leucocytes and the lymphocytes. Increase in the latter often amounts to 200 to 300 per cent. above the normal count (J. B. Murphy and E. Sturm). This pronounced lymphocytosis is held to be due to the enhanced proliferative activity of germinal centres in the spleen and lymph glands (W. Nakahara). As might be expected, the effects of the lymphocytosis thus induced are the reverse of those above noted as following X ray applications. There is a marked increase in resistance to transplanted cancer in mice, to the rate of growth of spontaneous tumours in these animals; and especially to experimentally induced tuberculosis in mice. The resistance is here increased two- to three-fold (Murphy and Sturm). The beneficial effect of sunlight upon clinical tuberculosis is known, and some observations are recorded upon the effect of sunlight upon the lymphocyte count in healthy individuals (J. B. Taylor). Thirty-eight subjects were examined. In 25 of the cases in which chronic solar dermatitis was produced there was an appreciable increase, percentage and absolute, in the number of circulating lymphocytes. In 8 there was a definite decrease and in 5 there was no appreciable change. Of the 13 cases with no lymphocytosis, 6 failed to tan and 5 had an extremely high lymphocyte to begin with. There was clearly a definite parallelism between the tanning and the blood changes. Similar blood changes follow exposure to small doses of X rays (Taylor and others), so that it is suggested that the sunlight effects are due to the ultra-violet rays of the spectrum. Rollier and others have emphasised the fact that tanning is necessary to obtain beneficial results in tuberculosis with heliotherapy. The relationship of this observation to the possible associated blood changes and the manner of their production is interesting and suggestive.

TRANSIENT HEMIANOPIA.

AS a symptom of ocular migraine momentary hemianopia is well known. As a phenomenon lasting for days or weeks and then ceasing it is very rare. A case is recorded by Tyson[1] of left superior quadrantic hemianopia occurring after an alcoholic debauch in a heavy smoker, lasting for a few days, and recurring nine months later after a renewal of excess in alcohol. On this occasion the visual defect lasted much longer, but after about three weeks the form fields had widened to within 10 degrees of normal, while the colour fields remained contracted in the left superior quadrants to about fixation point. The case is interesting as bearing upon the pathology of migraine on which subject various theories have been put forward. Perhaps the theory most generally held is that it is due to a nerve storm of the cerebral cortex akin to epilepsy, but there is another that it is the result of spasm in a cerebral artery. This case is brought forward in support of the latter theory, but although the patient gave a history of occasional attacks of migraine from the age of 8 to the age of 23, these had ceased five years before the hemianopic attacks began, and the connexion may have been fortuitous. That the cause of the latter was temporary occlusion of the posterior calcarine artery is supported by a case recorded by Beevor and Collier (not Beevor and Collins, as stated in the article) in 1904,[2] in which a

[1] American Journal of Ophthalmology, December, 1918.
[2] Brain, vol. xx.

permanent left superior quadrantic hemianopia was proved by an autopsy to be due to a softening of the whole lower half of the right visual cortex, caused by an occlusion of this vessel. It may be added that cases of transient hemianopia resulting from severe concussion of the cerebral cortex following upon wounds of the occipital region have recently been noted by Captain M. L. Hine[3] in which more or less complete recovery took place, the recovery for colour vision always lagging behind that for form vision. In cases of quadrantic hemianopia from war wounds it is usually the lower quadrant that is affected, the reason for this being that cases which recover are almost always due to wounds affecting the upper part of the visual cortex; not that the upper part is any more liable to be wounded than the lower, but whereas with occlusion of the calcarine artery the results are limited to the area of the cortex supplied by that vessel, wounds of the same region generally involve the medulla and cerebellum as well, so that the patient rarely survives.

A FREAK OF NATURE?

To the philosopher the capacity for error which he observes in his fellows, and particularly in his fellow philosophers, is a perennial source of surprises, and there is one branch of study—that of man's earliest history—which, on account of the mystery surrounding it and of the zeal which its fascination inspires, is especially productive of questionable conclusions. Dickens illuminated the subject with some satiric flashes in his story of the antiquarian discovery made at Cobham, and less eminent students of nature than the immortal Pickwick have also been misled by appearances. One has accepted as evidence of the artistic development of cave man the daubs on the wall of a boat-builder's former paint store; another has found neolithic "pot-boilers" on the site of a Jubilee bonfire. From time to time there are unearthed prodigies which may deceive the very elect. The fossil shell from the red crag described a few years ago by Dr. Marie C. Stopes, to the Prehistoric Society of East Anglia, is perhaps a case in point. It bore upon its surface a face of the kind which very youthful artists draw in these days, but which, possibly, in the childhood of the race represented the highest flights of the limner's art. Many geologists regarded it as a genuine product of primeval culture. More recently we have had, also from East Anglia, a similar "freak." It is a mass of chalk, about 4 inches long and between 2 and 3 inches in its other dimensions, which bears a fantastic resemblance to a mammoth, an animal with which the present generation has not even a nodding acquaintance, though enough is known about its appearance to justify us in calling it *Elephas primigenius*. The model, or as he prefers to call it, statue, was described and figured in the anthropological review, *Man*, for February last by Mr. Reid Moir, who is well known among geologists on account of his enthusiasm in the search for flint implements, and to the general public as being responsible for the recent appearance in the "agony" column of the *Times* of one of the oddest contributions ever made even to that quaint gallery—we mean the advertisement for the Foxhall mandible. Mr. Reid Moir regards the shaping of the piece of chalk discovered at Saxmundham as due to human agency, and from the circumstances attending its discovery it would, if taken at his valuation, be of great importance for the solution of the problem of the antiquity of mankind. But Dr. Charles W. Andrews, of the Natural History Museum, in a letter to *Nature* of March 13th, says that "the object is nothing more than a somewhat imperfect natural cast of a chamber of the shell of an Ammonite," and as Mr. Reid Moir, so far as we have seen, has not responded to the implied challenge the hopes raised by him may be doomed to disappointment.

[3] Brit. Journal of Ophthalmology, January, 1918.

LEFT SCAPULAR PAIN AND HYPERALGESIA IN HEART DISEASE.

THE significance of symptoms in the diagnosis of disease and in the estimation of its degree is receiving exact study in many departments of medicine. In pulmonary tuberculosis it is practically impossible to express an opinion as to the nature and stage of the disease without careful correlation of the symptoms with the physical signs observed. In heart disease the symptoms afford a valuable measure of the degree of the derangement of function caused by the lesion indicated by the physical signs and of the necessity for treatment. That various cardiac conditions are associated with some degree of præcordial pain and tenderness has long been familiar, but the extent, character, and radiations of these pains have perhaps not received the attention they deserve except in the case of angina pectoris. We publish in this week's issue of THE LANCET an interesting and suggestive note by Dr. John Parkinson upon a little-recognised form of cardiac pain and tenderness—namely, that occurring in the left scapular region. He has made a careful study of 50 cases in which these conditions were observed. The scapular pain is usually referred to a spot just below or internal to the lower angle of the left scapula, though it is sometimes felt along the vertebral border of the lower half of the scapula. It is apparently always accompanied by submammary pain, which is more generally recognised as of cardiac origin. The scapular pain is usually a later manifestation, though in a few patients it appeared to originate at the same time as the submammary. The hyperalgesia was less frequently present than the pain, and its extent was variable, as shown in the record of 10 cases given by Dr. Parkinson. The conditions in which left submammary and scapular pain was observed included valvular and myocardial disease, arterio-sclerosis and renal disease with cardiac embarrassment, especially when associated with high blood pressure; also "functional" heart disease and conditions of general ill-health with inefficient action of the heart. As might be expected, Dr. Parkinson finds the explanation of these symptoms in the well-recognised principle of referred pain in visceral disease, so ably elucidated by Dr. Henry Head and Sir James Mackenzie. He finds that the sixth thoracic segment alone or in combination with the fifth supplies the submammary and scapular regions to which the pain is usually referred. The hyperalgesia corresponds to the same segments, though it may extend to a larger area. He regards the development of hyperæsthesia in cases of chronic heart disease or disorder, especially when it persists or recurs, as indicating a new and more obstinate stage. In his opinion the hyperæsthesia induces and supplements the pain since it may be

started or provoked by various movements disturbing the hyperæsthetic areas. Dr. Parkinson's note illustrates well the manner in which careful record of symptoms may throw light upon disturbed function in disease.

THE GERMICIDAL VALUATION OF DISINFECTANTS.

SOME interesting particulars as to the question of adopting an international standard method for the testing of disinfectants have been sent us by Dr. S. Rideal, joint author of the well-known Rideal-Walker test. The subject has been in abeyance during the war, but a good deal of experience of the value of the test has been gained at the War Office, where it has been used for controlling the large quantity of disinfectants which have been supplied to the various fronts. Dr. Rideal has now had the opportunity of considering the standard specification which the British Disinfectant Manufacturers Association have agreed to adopt, and he finds that the method which they have formulated from their combined experience does not depart very materially from that originally put forward. Witte's peptone used in the broth for cultures was, of course, unobtainable, but has been effectively replaced by Messrs. Allen and Hanburys' "eupepton," an analysis of and report on which appeared in our columns (THE LANCET, Feb. 9th, 1918). The peptone employed, it is pointed out, should present as nearly as possible the same freedom from sugar and salt as did the majority of the samples of Witte's peptone used for this test before the war, and also the peptone finally adopted for the international test should be as readily obtainable as "lemco" in all countries. It is hoped that the difficulty in connexion with the strain of *B. typhosus* to be used in the test may also be eliminated by all workers agreeing to use the same organism, as is now the case in America. Dr. Rideal suggests that perhaps a central authority such as the Lister Institute would consent to maintain and distribute a standard agreed strain, and that the Rawlins's strain, which has been used by the War Office and several manufacturers as well as by himself, should henceforth be used as the test organism. Uniformity of procedure in this regard is, of course, essential, and we hope the Lister Institute will accept the suggestion. Attention is also drawn to the fact that although large quantities of British-made disinfectants are used in tropical countries and in our various campaigns, the control in this country has been made at the temperature originally suggested, viz., 15°–18° C., and this standard temperature is adopted now by the British manufacturers. This is different from the practice employed in America, where, owing to the large quantities of disinfectants being shipped to Cuba, the Panama zone, and the Philippine Islands, the American workers have adopted the higher temperature, 20° C., as being more comparable with the conditions of the users. There should, however, be no difficulty in working at the temperature adopted here even in a tropical climate, as ice is always available, but no Government department seems to have taken this point into consideration. The following memorandum gives the practical details of the standard bacteriological test (Rideal-Walker method) as adopted by the members of the British Disinfectant Manufacturers Association:—

Shake the bottle or other vessel containing the disinfectant well before proceeding to make the dilution. Make a 1 p.c. stock emulsion (5 c.c. of disinfectant added to 495 c.c. of boiled distilled water of 15° C.–18° C). From this stock emulsion prepare required dilutions in boiled distilled water, taking care that pipettes used for preparing stock emulsion as well as dilutions are, after emptying, always well washed out with and into the diluent, and that all dilutions, including stock emulsion, are well shaken before use. To 5 c.c. of a particular dilution add 0·2 c.c. (5 drops) of a broth culture of *B. typhosus* grown for 24 hours at 37° C. Shake immediately after medication. Keep medicated tubes at temperature of 15° C.–18° C. and take subcultures into 5 c.c. broth every 2½ minutes up to 10 minutes. Incubate for at least 48 hours at 37° C. (Rideal and Walker, *J.R.S.I.*, October, 1903, p. 424.)

Use as stock organism *B. typhosus* from a single colony on an agar-plate culture that has been grown at 21°–22° C. from two to seven days and removed by weekly transference for several uninterrupted generations from the original source (the human body).

Owing to the extremely important influence which the broth has on the characteristics of the *B. typhosus* employed as the test organism in the Rideal-Walker test, *particularly as regards the peptone*, attention is drawn to the fact that this is prepared according to the following modification of the formula of Dr. S. Rideal (Fourteenth International Congress of Hygiene and Demography, Berlin, 1907):—

Lemco, 20 grammes. Peptone (Allen & Hanburys "eupepton"), 20 grammes. Sodium chloride, 10 grammes. Water to 1 litre. Boil the mixture for 30 minutes, neutralise with normal caustic soda (phenolphthalein indicator), add 15 cub. centimetres of normal hydrochloric acid; make up to 1 litre with distilled water, filter and finally sterilise.

The culture employed must conform with the requirements laid down by the authors of the test (vide THE LANCET, Sept. 25th, 1915, p. 717), viz. "Life in 2½ and 5 minutes and no life thereafter," with "phenol dilutions not higher than 1-110 or lower than 1-90."

HERMANN BOERHAAVE.

THE 250th anniversary of Hermann Boerhaave's birth on the eve of the New Year, 1919, did not pass unnoticed in the country whose greatest medical genius he was. The Dutch Medical Association, in coöperation with the Dutch Chemical Society and the Society for the Advancement of the Historical Study of Medicine, Physics, and Mathematics, arranged for a fitting commemoration at Leyden, the seat of Boerhaave's activities, and not far from his birthplace at Voorhout. A report of the meeting held in the University Hall has just reached us. Dr. E. C. van Leersum, who occupies the chair of Medical History at Leyden, dwelt chiefly on Boerhaave's eminence as a physician, and Dr. Ernst Cohen, professor of chemistry at Utrecht, on his merits as a student of chemistry. Hardly Sydenham's equal as a physician, Boerhaave was par excellence a teacher justly famous for the logical and methodical treatment of his subject. Eloquent in style, dignified and graceful in delivery, his lectures were enlivened by anecdotes and incidents drawn from a rich storehouse of experience. At the same time, he won the confidence of his patients by untiring devotion and conscientious care. Kind and readily approachable, one who, in a libertine age, never let fall a coarse word or satirical remark, his extensive knowledge of human nature made him a trusted helper and friend to an ever-widening circle. His attention was largely concentrated on the workings of the human mind, of the powerful influence of which on the body and on its various morbid states he was fully aware. Nowadays suggestion or hypnotic force would be credited with a large proportion of his cures. Under the attractive influence of Boerhaave's character the fame of Leyden University, especially as a school of medicine, grew so that it became a rendezvous of strangers from every part of Europe. Many Englishmen and Scotsmen attended his lectures in those days, and it was to these that Oliver Goldsmith alluded when he wrote: "'Twill be proper to go, though only to have it said we have

studied in so famous a University." Of 178 undergraduates who took the degree of M.D. under the auspices of Boerhaave's tuition, 43 were of British origin. As an additional proof of the reputation Boerhaave enjoyed in England may be mentioned the fact that he was elected a Fellow of the Royal Society. Alexander Monroe, the Edinburgh anatomist, and John Rutherford were among his pupils. The latter, who commenced the clinical teaching of medicine in the University of Edinburgh, admitted his indebtedness to what he had seen and heard at Leyden, and Boerhaave, who remained the friend and helper of his former pupils, continued to give him counsel and advice by correspondence. Those who desire to form for themselves an estimate of Boerhaave's many-sided genius may consult the translation by Miss Margaret E. Thompson of 14 hitherto unpublished letters preserved, addressed by the Dutch professor to an old student, Cox Macro, the son of a magistrate at Bury St. Edmunds, which was published in the Proceedings of the Royal Society of Medicine.[1]

FEES FOR NOTIFICATION OF INFECTIOUS DISEASES.

ALONG with other interested bodies the Association of Panel Committees has repeatedly made representations to the Local Government Board with regard to the reduction in the fees for notification of infectious diseases. The Secretary of the Association has now received a letter, dated March 27th, signed by Mr. H. O. Stutchbury, to the following effect:—

"I am directed by the President of the Local Government Board to advert to your letter of the 8th instant, regarding the fees for notifications of infectious diseases, and to state that Section 5 of the Local Government (Emergency Provisions) Act, 1916, which reduces the fee from 2*s.* 6*d.* to 1*s.* will come to an end when peace is ratified."

The ratification of peace will put an end to a piece of economy which has been wildly extravagant in the annoyance it has produced.

THE Wednesday social evenings at the Royal Society of Medicine will not be held on April 9th, 16th, and 23rd.

THE death is announced of Sir James Mackenzie Davidson, consulting medical officer to the X ray department of a number of London hospitals, whose name has been a household word in connexion with radiology for the last 20 years.

[1] 1917, xl. (Supplement: History Section), pp. 21–46.

Professor A. Schuster, F.R.S., and Dr. W. C. Unwin, F.R.S., have been reappointed by the King in Council to be members of the Senate of the University of London.

THE Board of Education has issued a circular to local education authorities and governing bodies containing instructions with regard to filling in the various forms of application under the School Teachers (Superannuation) Act, 1918. The forms include (1) service forms in which particulars of service claimed for the purposes of the Act may be entered; (2) form of declaration as to health to be made by a teacher with a view to the payment of a death gratuity if he dies in recognised service (to be claimed only by teachers who are under the age of 60 on April 1st, 1919); and (3) form of medical certificate to be furnished in respect of teachers between the ages of 55 and 60 on April 1st, 1919, in connexion with a claim for a death gratuity.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

Medical Inspection of Schools in Ireland.

THE discussion in Parliament on the second reading of the Medical Treatment of Children (Ireland) Bill, reported in the last issue of THE LANCET (p. 534), disclosed the essential weakness of the Bill in that its provisions are permissive and not mandatory. The failure of public health legislation for Ireland in the past—scanty as it has been—has been largely due to the fact that it has all been permissive, and for the most part has not been acted on by the local health authorities. The Chief Secretary for Ireland, speaking to a medical deputation last week at Dublin Castle, declared that the reason for this was that Irish Members of Parliament would accept no mandatory health legislation. Almost at the moment when he was speaking in Dublin, the Attorney-General for Ireland, at Westminster, was, on behalf of the Government, sturdily resisting the unanimous demand of the Irish representatives that the Medical Treatment Bill should be mandatory. Without such an alteration in the Bill as they demand it is hard to hope that it will have any effect. In Ireland the county and county borough councils, whom the Bill empowers to spend money on inspection and treatment of school children, have no concern with the schools, which are under the management of the clergy of the various churches. They are not likely to accept the duty of inspection unless it is imposed on them by law. Another weakness in the Bill is that it gives a parent the power to refuse inspection and treatment of his child. It would, in fact, be within the rights of a parent to send his child to school in such a verminous or diseased condition as to be a danger to other children. The Bill gives no power to inspect or report on school buildings, many of which, in Ireland, are insanitary or overcrowded or otherwise unsuitable.

Ireland and the Ministry of Health Bill.

Half a loaf is better than no bread, and though Ireland has failed to get the extensive reforms in health administration which she demanded, yet the amendments accepted by the Government consenting to have a medical man as chairman of the Irish Health Council and to widen the scope of the Council by the inclusion of a number of representatives of various interests, render the Council a basis for potential extensive reform. The Council as originally proposed was, except for three nominated medical members, composed of existing officials, and was a singularly uninspiring body. By the infusion of a large non-official element the constitution of the Council has been greatly strengthened. It is to be regretted that the Chief Secretary has declined to allow the medical profession to elect the medical members of the Council, and that he clings to nominations. It is important that the profession should have confidence in the constitution of the Council. It is a fault in the Bill, too, that one medical member of the Council must be a woman. While there is no desire to exclude a woman doctor merely because she is a woman, it is a mistake when only three medical practitioners in all are to be nominated to limit the field of choice by such a provision. The number of medical women practising in Ireland is small and the field of choice narrow. The essential point for the Government is to choose an efficient, energetic, and progressive medical practitioner as chairman. If they fail in this the Council has little or no chance of succeeding.

Belfast Doctors and the Ministry of Health.

At a meeting of members of the medical profession, held in the Medical Institute, Belfast, on March 26th, the following resolution was passed unanimously:—

"That we, the medical practitioners of the county borough of Belfast, being convinced of the absolute necessity of a solidly united profession to deal with the problems involved in the application of a Ministry of Health to Ireland, deprecate in the strongest manner any action that would tend to divide or create disunion in the profession; and, being further convinced that the Irish Medical Committee is the only body thoroughly representative of every section of the Irish medical profession, appeal to medical men to give it their unanimous support as the mouthpiece of the profession in Ireland."

March 31st.

EDUCATION IN OPHTHALMOLOGY.

THE Council of British Ophthalmologists [1] have issued the following report on the teaching and examination of medical students in ophthalmology, after consideration of this important subject from various points of view. The report was drawn up by the following committee appointed by the Council: Mr. J. B. Lawford (chairman), Sir John Tweedy, Mr. Treacher Collins, Dr. George Mackay, Mr. Gray Clegg, Mr. P. H. Adams, Mr. Stephen Mayou, and Mr. Leslie Paton. It is divided into three parts: Part I.: Representations to the General Medical Council on the subject; Part II.: Existing regulations concerning the teaching and examination in ophthalmology in the United Kingdom and abroad; Part III.: The need for improved instruction of medical students in ophthalmology; and Part IV.: Summary of recommendations.

Part I.—Representations to the General Medical Council on the Subject.

By the courtesy of the General Medical Council the following information has been obtained:—

In 1879, 24 prominent ophthalmic surgeons presented a petition to the General Medical Council, advising a compulsory three months' course in practical ophthalmology for medical students, and pointing out to the Council the neglect of training in this subject as compared with Continental and Indian Universities. As the result of this petition the General Medical Council approached the various examining bodies in the United Kingdom, and subsequently made the following recommendation: "With reference to ophthalmology, the opinion of the bodies is almost unanimous that, under the present arrangements of their respective examinations, the subject of ophthalmology receives its fair share of attention, and that it would not be desirable, either to require attendance on a special course of lectures on ophthalmology as part of the curriculum for a medical student, or to make ophthalmic surgery a distinct subject of examination (separate from surgery) at the Pass Examination for a Licence to practise. The Committee [2] see no reason to dissent from that opinion of the Licensing Bodies, and they accordingly do not advise the Council to recommend that a special course of study of ophthalmology, or a distinct examination in that subject, should be required."

On May 29th, 1891, the Ophthalmological Society of the United Kingdom [3] presented a memorial to the General Medical Council in favour of including ophthalmic medicine and surgery in the ordinary curriculum. This was received by the Council and entered on their minutes, but no further action was taken at the time. On May 26th, 1906, the General Medical Council approved a report of the Examination Committee that: "The inspectors called attention to the circumstance that at some boards no evidence of knowledge of ophthalmology was required." On Nov. 26th, 1910, the General Medical Council adopted a report of their Education Committee as follows: "In the curriculum of all the licensing bodies, with three exceptions, special courses on ophthalmology form an essential part. The Committee are of opinion that every student of medicine should receive some special instruction in the subject. The Committee do not think it necessary to insist that every student should be examined in ophthalmology, but they are of opinion that all students should be liable to be examined in some branch of the subject." In 1911 a communication from the British Medical Association asking that the study of ophthalmology should be made compulsory in the medical curriculum was brought before the General Medical Council. In reply the attention of the British Medical Association was called to the report by the Education Committee in November, 1910, cited above.

[1] The Council of British Ophthalmologists consists of (1) permanent members, being the presidents (past and present) of the Ophthalmological Society of the United Kingdom, and of the Section of Ophthalmology of the Royal Society of Medicine: Sir Anderson Critchett, Bart., C.V.O. (President), Sir John Tweedy (Vice-president), Mr. Priestley Smith (Vice-president), Sir George Berry, Mr. F. Richardson Cross, Mr. J. B Lawford (treasurer), Mr. W. Lang, Mr. E. Treacher Collins, Mr. J. B. Story, Mr. W. T. Holmes Spicer; (2) elected members (*a*) by the Ophthalmological Society of the United Kingdom: Mr. J. Gray Clegg, Colonel J. Herbert Parsons, Mr. Stephen Mayou, Mr. A. B. Critchland; (*b*) by the Section of Ophthalmology of the Royal Society of Medicine: Mr. J. Herbert Fisher, Dr. George Mackay, Mr. W. G. Laws, Mr. Leslie Paton (hon. secretary); (*c*) by the Oxford Ophthalmological Congress: Mr. P. H. Adams.

[2] I.e., The Education Committee of the General Medical Council.

[3] Trans. Oph. Soc. U.K., vol. xii., 1892, p. 225.

Part II.—Existing Regulations concerning the Teaching and Examination in Ophthalmology in the United Kingdom and Abroad.

The present condition of ophthalmic training and examination in Great Britain and abroad was ascertained by a circular letter sent to the principal universities and other examining bodies at home and among the allied and neutral countries. In consequence of the war, the circular failed to reach some of those to whom it was addressed, but answers have been received from 22 examining bodies in Great Britain and Ireland and from 26 colonial and foreign universities. Their analysis is as follows:—

A. The Teaching and Examination in Ophthalmology in the United Kingdom.

1. The requirements as to training are as follows:—(*a*) No certificate of training in ophthalmology required: Universities of Oxford and Cambridge. (*b*) Ophthalmology one of four optional special subjects, certificates required for two only: The Society of Apothecaries of London. (*c*) A certificate of attendance at an ophthalmic clinic for three months required: Universities of London, Liverpool, Aberdeen, Dublin (Trinity College), Queen's University of Belfast, Conjoint Boards R.C.S. England and R.C.P. London, R.C.P. and S. Edinburgh and R.F.P. and S. Glasgow (13 attendances), R.C.P. and S. Ireland. (*d*) Certificates of attendance on a course of lectures and clinical instruction required: Universities of Edinburgh, Glasgow, St. Andrews, Wales, Durham, Birmingham, Manchester, Sheffield, Bristol, Leeds, National University of Ireland.

2. The methods of examination are as follows:—(*a*) An occasional question in the surgery paper, or *viva voce*; the examiners not being ophthalmic surgeons: Universities of Oxford, Cambridge, London, Durham, Leeds, Sheffield, Bristol, Glasgow, Aberdeen, Wales; Conjoint Examining Boards R.C.S. England and R.C.P. London, R.C.P. and S. Edinburgh, and R.F.P.S. Glasgow; Society of Apothecaries of London. (*b*) Special examination conducted by ophthalmic surgeons as part of the qualifying examination: University of Dublin, Trinity College, National University of Ireland, Queen's University of Belfast, Royal College of Physicians and Surgeons, Ireland, Universities of Liverpool, Birmingham, Manchester. (*c*) Class examinations. The certificates required before admission to the qualifying examination given only to students who attend a recognised course regularly and reach a defined standard in the class examinations: Universities of Edinburgh and St. Andrews (commencing 1919). (The regulations under (*a*) also apply to these two Universities.)

B. The Teaching and Examination in Ophthalmology in Colonial and Foreign Universities.

America.—The report of the Carnegie Trust on Medical Education in America has been of great assistance to the Council in selecting the universities to which circulars should be sent.

United States.—University of Michigan, Ann Arbor; Johns Hopkins University, Baltimore; Harvard University, Boston; North Western University, Chicago; University of Illinois, Chicago; Rush Medical College, University of Chicago; Western Reserve University, Cleveland; Universities of Kentucky, Louisville; and Bellevue Medical College, New York; Columbia, New York; Cornell, New York; Yale University.

Canada.—McGill University, Montreal; University of Toronto.

All the above, with the exception of the North Western University, Chicago, require students to attend both a course of lectures and a course of clinical instruction, and hold special examinations conducted by ophthalmic surgeons. The North Western University, Chicago, requires a certificate of attendance on a course of clinical instruction in ophthalmology and there is no special examination.

France.—University of Paris: Clinical course in fourth year, certificate after examination. University of Toulouse: Clinical course of one term, ophthalmology alternates with dermatology as a special subject in the qualifying examination. University of Lyons: Clinical course of one term. University of Montpellier: No certificates required.

Switzerland.—The State examination for a diploma to practise medicine includes an oral and practical examination in ophthalmology conducted by two ophthalmic surgeons. University of Basle: A course of lectures during two terms and a clinical course of three terms. University of Lausanne: Clinical course of one term.

Spain.—Central University of Madrid: Course of 82 lectures and clinical attendance from October to May. Examination at the end of the course conducted by the professor of ophthalmology. University of Barcelona: Course of 68 lectures; otherwise exactly as Madrid.

Sweden.—The examination in ophthalmology is entirely practical and oral, and is conducted by the professor. University of Upsala: A course of lectures and two months' clinical course.

Norway.—*Viva-voce* examination as in Sweden. University of Christiania: Clinical course of one term.

Denmark.—University of Copenhagen: Clinical course twice weekly during one term. Occasional question in the surgery paper in the qualifying examination.

Japan.—University of Kyoto: A course of lectures and a clinical course. The examination in ophthalmology is oral and is conducted by ophthalmic surgeons.

The above analysis shows that Great Britain stands almost alone in granting diplomas to practise medicine without evidence of an adequate knowledge of diseases of the eye. There are still three examining bodies which have not even adopted the recommendation of the General Medical Council of 1891, which requires a certificate of attendance at a three months' clinical course. Moreover, at other institutions the interpretation of what is meant by a three months' course varies greatly and should be more accurately defined, as it is by all the American Universities. In Great Britain only a small minority of the licensing bodies apply regularly a test of ophthalmic knowledge. In Ireland and in the great majority of foreign universities ophthalmology is one of the subjects of the qualifying examinations, and the examiners are invariably ophthalmic surgeons.

Part III.—The Need for Improved Instruction of Medical Students in Ophthalmology.

In the opinion of the Council the knowledge of ophthalmology possessed by the majority of medical students in Great Britain at the time of their qualification is inadequate to enable them to diagnose and treat efficiently cases of ordinary eye diseases met with in general practice. In 1917 Sir Arthur Downes, in the Report of the Departmental Committee of the Local Government Board on the Welfare of the Blind (p. 60), quoted, and endorsed as still applicable, the statement made in the memorial presented by the Ophthalmological Society of the United Kingdom to the General Medical Council, in 1891, that "it is notorious that the general body of the profession does not possess a competent knowledge of diseases of the eye." Unless further action is taken in the matter this reproach to the medical profession will continue. The opinions of the Council hereupon are:—

The Council hold that it is desirable that the training in ophthalmology should be mainly clinical, and they agree that a period of three months is all that can be allotted to the subject in a five years' curriculum. They, therefore, recommend: (1) that attendance at an ophthalmic clinic for not less than six hours a week during a period of three months shall be required of every student; (2) that such a period of clinical training shall be supplemented by a course of systematic lectures or clinical classes.

A very serious defect in the existing regulations is the absence of any test of the student's knowledge of ophthalmology in the qualifying examinations. Teachers in the medical schools are well aware that without the stimulus of an examination many students give the least possible attention to ophthalmology and may, and often do, finish their training without gaining even a rudimentary knowledge of the subject. In the opinion of the Council, it is most desirable that an examination in ophthalmology should be made an integral part of the qualifying examination by all those licensing bodies which have not hitherto included it in their schedule.

Internal students.—When an examining board deals only with students trained within its own walls the system adopted by the Universities of Edinburgh and St. Andrews has the advantage of not adding to the burden of the qualifying examination. At the end of the course in ophthalmology there is a written and a practical examination, and certificates of admission to the qualifying examination are not granted to students unless they have attended the course regularly and have reached a definite standard in the class examinations.

The Council are of opinion that in such examinations, as in those for qualification, a second examiner should be associated with the teacher.

External students.—A different problem confronts such examining boards as the Universities of Oxford, Cambridge, and London, and the Conjoint Boards, which have to deal with students trained under diverse conditions in institutions over which the boards exercise little supervision. Such bodies should require definite evidence of regular attendance at an ophthalmic clinic and at a course of systematic instruction. In addition they should have a test that the student has acquired an adequate knowledge of the subject. The Council do not consider it essential that this test should be by a written examination, but they hold that there should always be a practical and oral examination in the diagnosis and treatment of the commoner diseases of the eye and in the use of the ophthalmoscope. Such an examination can only be carried out efficiently by ophthalmic surgeons who should also set and adjudicate on such ophthalmic questions as may be given in papers.

In the examination in ophthalmology, as in the examinations in pathology, surgical anatomy, &c., a candidate who does not attain to the required standard must be held to have failed to qualify in surgery.

Part IV.—Summary of Recommendations.

The Council therefore make the following recommendations:—

(1) No student shall be admitted to the Final Examination, qualifying to practise medicine, unless he has attended an ophthalmic clinic for not less than six hours a week during a period of three months, and has attended a course of systematic instruction in ophthalmology.

(2) No student shall be considered to have passed the qualifying examination unless he has shown a sound knowledge of practical ophthalmology in an examination conducted by ophthalmic surgeons.

Obituary.

STEWART HENRY ROUQUETTE, M.A., M.B., M.CH. CANTAB., F.R.C.S. ENG.,

OFFICER OF THE BRITISH EMPIRE.

IN the death of Mr. S. H. Rouquette on Feb. 28th, after a short illness, St. Thomas's Hospital has lost both a friend and a surgeon of great ability.

Stewart Henry Rouquette was born in 1887, and his schooldays were spent at Eastbourne College. In 1905 he went to King's College, Cambridge, taking honours in the Natural Science Tripos. His academic career was not in any way remarkable, but his personal qualities impressed themselves there in the circle of intimate friends which he retained throughout his subsequent career. In 1909 he went on to St. Thomas's Hospital, where he worked hard and steadily, passing his professional examinations with more than ordinary credit, and gaining the Solly Medal in 1912 for the best series of reports of surgical cases. In the same year he took his medical degrees at Cambridge and the Fellowship of the Royal College of Surgeons of England. A year later he took the further degree of Master of Surgery of his University, and was appointed surgical registrar of St. Thomas's Hospital. He became resident assistant surgeon in 1915, and held this post until the beginning of the present year. During the whole of his term of office he had to work at high pressure, five of the surgeons being away in France, and the others occupied at distant military hospitals. Nevertheless, the work had to be done, and Rouquette did it well, although it meant working half the night as well as all the day, finding time also to act as consulting surgeon not only to Lady Ridley's Hospital for Officers, but later to the French Hospital. At Lady Ridley's Hospital he personally performed nearly all of the operations, and many former patients there will ever gratefully remember his care and skill.

In the last two years of his life Mr. Rouquette carried out in conjunction with Dr. Hector Mackenzie important work on the treatment of exophthalmic goitre, and his record of over 90 operations without a death is a remarkable testimony to his skill. Thyroid surgery and nerve suture were, perhaps, the subjects in which he was most interested at the time of his death, which came so untimely. His loss will be deeply mourned by all his friends, and great sympathy is felt with his parents and with his young widow. A few weeks before his death he was appointed an Officer of the Order of the British Empire in just recognition of the work he had done during the war.

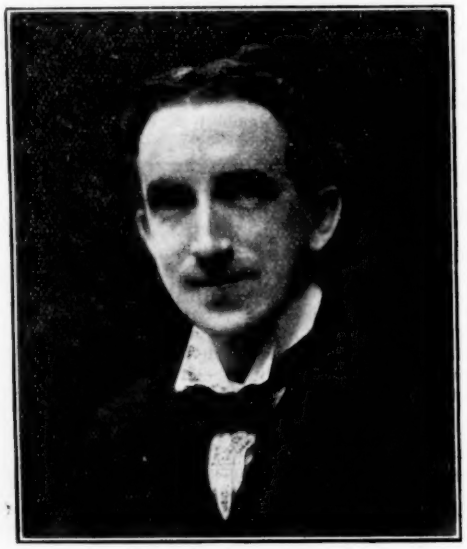
Concerning his personal qualities, Dr. Dallas Ross, Captain, R.A.M.C., writes:—

"Of gentleness, of chivalry, of the scorn of wrong that is a religion worth a hundred lesser creeds, of absolute integrity of character Rouquette had an abundance that is given to few men. Of the qualities which make a first-class surgeon he had an ample share—daring, concentration that wastes no time in idle things, an inflexible purpose, an unquenchable spirit of perseverance that made him, when he had

discovered himself and realised his powers, most truly what he wanted to be. His professional progress in the last few years of his life was remarkable. His industry was boundless. He had the boldness of a man who knowing what is to be done, sees the difficulties and overcomes them."

Dr. Hector Mackenzie writes :—

"Only a few months ago we at St. Thomas's had to lament the loss of a senior colleague, Mr. Betham Robinson, an acknowledged master of his art, rich in knowledge and experience. Now death has laid low one who had just begun 'to win his honour and to make his name,' the young and highly gifted surgeon, Mr. Stewart Rouquette. His great opportunity came when he was appointed resident assistant surgeon to St. Thomas's Hospital in 1915, at



MR. S. H. ROUQUETTE.

a time when the work of the hospital was being carried on under great difficulties. He soon proved himself to be possessed of great skill and resourcefulness, as well as untiring energy, enthusiasm, and devotion to duty, while all his surgical work was of the highest standard; but I must specially mention the operations performed during the last two years in association with me in cases of exophthalmic goitre. He undertook at my request the operation of thyroidectomy under local anæsthesia, and did it so skilfully and successfully that he established a record which, as far as I know, has never been equalled. Our experience at St. Thomas's of the operation of thyroidectomy under general anæsthesia had been so unfavourable that I had come to consider it seldom justifiable. I was introduced to the method of operating under local anæsthesia by my friend Mr. T. P. Dunhill, of Melbourne, and it was his technique which Rouquette adopted and practised with such success. The operation of thyroidectomy in exophthalmic goitre is one of the most difficult in surgery, and the record of a long series of successes without a failure is the highest testimony to his skill as an operator."

Rouquette was highly gifted with those qualities which are needed to make a surgeon—ability, temperament, knowledge, and skill. He had made for himself a great reputation at St. Thomas's, and had he lived there is no doubt that he would have attained the highest eminence in his profession.

RALPH WINNINGTON LEFTWICH, M.D., C.M. ABERD.

Dr. R. W. Leftwich, the well-known author of the "Index of Symptoms," died at his residence, Ebury-street, London, S.W., on March 25th, after a short illness. He was 70 years of age, having been born in London in 1849, the son of an architect. He studied medicine in London and Aberdeen, later taking post-graduate courses at Paris and Vienna. After gaining two scholarships at St. Bartholomew's Hospital he became a Member of the Royal College of Surgeons of England in 1873, and graduated M.B., C.M. Aberd. with honours in the same year. For a time he acted as house surgeon at the East London Children's Hospital, where he afterwards joined the honorary staff. At the time of his death he was consulting physician to the Metropolitan Electric Tramway Company, the London United Tramway Company, the Société des Voyageurs de Commerce, and the British Electric Traction Company, as well as medical referee to the Gresham and Atlas Insurance Companies.

Dr. Leftwich was the author of a number of well-known medical books of real value to the student and general practitioner. They were marked not only by knowledge, but also by originality of treatment and the power of deduction. His first book, "An Index of Symptoms," was published in 1888, and is now in its sixth edition. His other medical books included "The Pocket-Book of Treatment," "Tabular Diagnosis," and "Rational Therapeutics." Dr. Leftwich was also a keen student of Shakespeariana, and to a paper which he wrote showing that St. Saviour's, Southwark, was Shakespeare's parish church and presumably the poet's place of worship is due the erection of the Shakespeare memorial there. Other original papers included one on John Hall, Shakespeare's son-in-law, a well-known physician of his time, and one read before the Historical Section of the Royal Society of Medicine on March 19th last, where he showed from a detailed study of the authentic signatures of Shakespeare that in each case there are clear indications, increasing with age, of "writer's cramp," and that to this cause may probably be assigned the sterility of the poet's last years, for which no satisfactory explanation has hitherto been found.

The War and After.

MINISTRY OF NATIONAL SERVICE: SIR AUCKLAND GEDDES THANKS THE MEDICAL DEPARTMENT.

WITH the termination of the work of the Ministry of National Service the Director-General, Sir Auckland Geddes, has issued a statement expressing his high appreciation of the services rendered by the medical profession in connexion with the work of the Ministry during the past two years. Letters of thanks have been sent to the chairman of the Central Professional Committees in Great Britain, expressing the Director-General's acknowledgment of the work done by these committees, and by the Local Medical War Committees throughout the country. Without the hearty coöperation of the members of these committees, the statement runs, it would have been a much more difficult task to supply the military forces with the numbers of medical officers necessary, while still maintaining any adequate service for the civilian population. These committees have also given valuable assistance in helping to solve the difficult problems involved in the demobilisation of medical officers.

Sir Auckland Geddes also thanks very heartily those practitioners who have enabled the work of the National Service Medical Boards to be done so well. The very small proportion of complaints and of sustained appeals which followed the establishment of these boards is, he says, an index of the efficient professional work rendered by these medical men. The work has been done in so accurate a fashion as to provide data of the physical condition of the population which will be of the highest value, both from the scientific and from the national point of view.

The work of the medical profession, both in connexion with the Professional Committees and with the National Service Medical Boards, has been often arduous, and in expressing his thanks, on behalf of H.M. Government, Sir Auckland Geddes wishes to assure the members of the medical profession engaged in this work that by their services they have contributed in no small degree to the successful issue of the war.

THE CASUALTY LIST.

The names of the following medical officers appear among the casualties announced since our last issue :—

Died.

Capt. G. C. Metcalfe, R.A.M.C., was educated at Cambridge University and at University College Hospital, London, and qualified in 1914. He died at Lucknow, India, as the result of an accident.

Capt. W. S. Brown, R.A.M.C., was educated at Cambridge University and at St. Thomas's Hospital, London, and qualified in 1916. He died on the homeward voyage from Mesopotamia of illness contracted on service.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Major H. F. H. Strugnell, Royal Marine Light Infantry, died as the result of a motor accident at Brindisi, eldest son of Dr. F. W. Strugnell, of Highgate, London.

Mr. T. M. Begg, late Royal Navy, died at California of illness contracted on service, only surviving son of Dr. C. Begg, of Bath.

OBITUARY OF THE WAR.

ROBERT JOHN BASSETT, L.R.C.P. & S. IREL.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant R. J. Bassett, who was drowned by the sinking of R.M.S. *Leinster*, on Oct. 10th last, in his twenty-eighth year, was son of Mr. T. W. Bassett, formerly of Waterford. He was born at Cork, and educated at Cork Grammar School. He at first thought of qualifying as a veterinary surgeon, and entered the Veterinary College, Balls Bridge, Dublin, in 1911, but, deciding to study medicine, he entered the Royal Colleges of Physicians and Surgeons, Ireland, as a student in 1912, taking his diploma at the end of 1917. Before passing his final examination he acted as house surgeon to the Londonderry Infirmary for four months. He obtained a commission in the R.A.M.C. in February, 1918, and, after reporting at Portobello Hospital, Dublin, crossed to Blackpool, going on to join the B.E.F. in France. He was at first attached to a West Riding Field Ambulance, and later was medical officer in charge of a section of the Hants Regiment, during which period he was present at the Somme retreat, second battle of the Marne, Havrincourt Wood and village, and the final advance on the Hindenburg line and Canal du Nord. He came home on leave in September, and was on his way back to duty when he met his death. Lieutenant Bassett had applied for a transfer as M.O. to the R.A.F. He intended taking Primary Fellowship in his college at the expiration of his year of service should he decide to relinquish the army. Although a keen student and devoted to his profession, he was a good golfer and billiard player.

F.M.S. MILITARY HOSPITAL, KIMPTON.—The military hospital maintained throughout the war by the Federated Malay States at Blackmore End, Kimpton, Herts, was closed on Monday, March 31st. The total number of patients treated at the hospital since its establishment was 2507.

HOSPITAL FOR CONSUMPTION, BROMPTON.—The report submitted to the annual court of governors on March 21st stated that the hospital had continued throughout the war to place full facilities at the disposal of the authorities for the admission of sailors and soldiers discharged from the services with consumption. Most of those who had passed through the wards had been transferred to the sanatorium at Frimley, and under the supervision of Dr. W. O. Meek, the medical superintendent, had made steady and satisfactory progress. The committee reported that through the generous response to a special appeal they had been enabled to acquire additional land, and were now in a position to increase the number of beds from 100 to 150 whenever required. Another appeal is therefore made for funds which will enable such beds to be opened for men discharged from the services.

Public Health.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

City and County of Newcastle-upon-Tyne.

IN his annual report for the year 1917 Dr. H. Kerr records a satisfactory improvement in the health of the city despite the continuance of the war. This state of matters he attributes largely to the steady employment during the period in question and the relatively high wages paid in the district, with consequent regular habits and absence of destitution. Further, the strict system of liquor control has probably played an important part in the realisation of a standard of domestic comfort never before so general as now. Absence of great warmth in summer effectually checked the development of summer diarrhœa, which in warm and sultry years plays havoc with infant lives. The year established a record for low incidence of infectious diseases; indeed, it is only the maladies consequent upon stress and strain which continue to make greater claims each succeeding year, and it is to be noted that diseases of the nervous and circulatory systems continue, as they have done for a number of recent years, to bulk ever more prominently in the death returns. In curious commentary upon complaints of shortage or absence of many of the foodstuffs ordinarily consumed, the number of deaths from digestive diseases has undergone substantial diminution during the period of the war, and in 1917 was little more than one-half of what it was in 1914. Deaths from cancer have been decreasing regularly for the last five years.

A special report by Dr. W. H. Dickinson, tuberculosis medical officer, on the influence of war conditions on the death-rate from consumption was submitted to the sanitary committee in July, 1917, and is incorporated in Dr. Kerr's report. In it reference is made to the conditions likely to render persons susceptible to infection, notably poverty, bad housing, and stress and strain. Particular attention is directed to the very striking increase during 1916 and 1917 in the number of deaths among girls between the ages of 15 and 20 years. The number of deaths in this group, which had previously shown a steady annual decline, suddenly increased by 60 per cent. in 1916, while in the first half of 1917 there were more deaths than in the whole of 1916. Young women have perhaps been affected more than any other class of the community by the new conditions and necessities brought about by the war. They have filled gaps, caused by the absorption of the able-bodied men into the Army, in factory, shop, office, and have also engaged in the heavier outdoor employments. It would appear that the changed condition of life has had some influence upon the phthisis death-rate, more especially as the phthisis incidence in Newcastle on the population as a whole was rather less in 1917 than in previous years.

In commenting on the neglect of infantile vaccination, which prevails in Newcastle as well as in most other parts of the country, Dr. Kerr expresses the view that all the duties in connexion with vaccination now exercised by officers of the Poor-law authorities should be transferred to the sanitary authorities, who are responsible for the control of small-pox. Without any desire to criticise the personal energy or efficiency of the vaccination officers, he thinks that the health visitors of the sanitary authority, whom the mothers know and receive as friends, would probably be more successful in persuading parents to have their children vaccinated. There is much to be said in support of this view, and it is to be hoped that it will receive the careful consideration of the authorities concerned.

City of Birmingham.

Despite the stress and strain imposed by war conditions Birmingham enjoyed during 1917 the healthiest year on record. The general death-rate (12·6 per 1000) and the infantile mortality rate (101 per 1000 births) were both lower than ever before, and many of the records in regard to individual diseases were also as low as or lower than in any previous year. Dr. J. Robertson, the medical officer of health, alludes to the fact that the reduction in the death-rate and consequent preservation of life in the city is continuous and progressive in character, and expresses the hope that much may still be accomplished by the policy of

educating the public in the plain truths of healthy living. He emphasises the urgent need of more houses in Birmingham to reduce overcrowding and replace the unwholesome back-to-back courtyard houses with healthy homes.

The report contains an interesting account of the incidence of measles and of the mortality resulting from that disease in different areas of the city and in houses of different size. During the year under review there were 15,516 cases of measles, which resulted in 333 deaths, and 472 cases of German measles, 4 of which had a fatal termination. There was an extensive epidemic of measles in Birmingham, which commenced in the fourth quarter of 1916 and ended in the third quarter of 1917. The following are a few of the deductions drawn from study of the statistics of the epidemic in which more than 17,000 cases occurred. For purposes of comparison the city was divided into three areas—namely, "central wards," "middle ring," and "outer ring." It was found that there was no striking disparity in the prevalence of measles in these three groups of wards, the average number of cases per 1000 of the population in the "central wards" being 18·6; in the "middle ring," 18·9; and in the "outer ring," 20·9. The difference in the fatality rates was, however, very marked. This rate per 100 cases in the "central wards" was 3·8; in the "middle ring," 2·1; and in the "outer ring," 0·7. In order to carry the inquiry further the measles rates in houses of different sizes were worked out. The rate of incidence per 1000 houses and the number of deaths per 1000 cases respectively in three-roomed houses were 100·5 and 38; in four-roomed houses, 111·0 and 25; in five-roomed houses, 86·1 and 15; in six-roomed houses, 96·9 and 9; in seven-roomed houses, 40·0 and 7; and in houses with eight rooms or over 63·2 and 3. These figures show that the prevalence of measles in the larger houses was not nearly so great as in the smaller houses. This is what might be expected, because the residents in larger houses are more widely separated and therefore less exposed to infection than in the smaller dwellings, and the proportion of adults per house is probably larger, thus lessening the incidence of the disease. But the fatality rates in houses of different sizes are much more striking than the figures relating to incidence. Of the 1012 cases of measles in houses of eight rooms and upwards only 3 proved fatal, equal to a case mortality of 3 per 1000, whereas in three-roomed houses there were 4021 cases of the disease with 145 deaths, giving a case mortality of 36 per 1000, or 12 times as high.

In considering this question, however, it is important not to lose sight of the fact that the children of the well-to-do classes generally receive much greater care and attention than those in working-class families. They are usually put to bed as soon as the rash appears and are carefully nursed under medical supervision. An attempt is also often made to isolate the patient from the other children in the household. The working-classes, on the other hand, generally regard measles as a disease of no importance and take little trouble to isolate the patient, even where this is possible, or to take sufficient care of the sick child to avoid unnecessary exposure which may give rise to subsequent complications. It is for this reason that the Local Government Board made measles a notifiable disease and empowered local authorities to provide home nursing.

URBAN VITAL STATISTICS.

(Week ended March 29th, 1919.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had steadily declined from 35·7 to 20·9 in the four preceding weeks, further fell to 19·3 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the annual death-rate was 17·6, or 0·4 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 7·0 in Eastbourne, 7·8 in Wimbledon, and 9·0 in Coventry, to 29·6 in Oldham, 33·2 in Bury, 33·6 in Merthyr Tydfil, and 36·7 in Great Yarmouth and in Middlesbrough. The principal epidemic diseases caused 201 deaths, which corresponded to an annual rate of 0·6 per 1000, and included 67 from measles, 50 from diphtheria, 49 from infantile diarrhœa, 24 from whooping-cough, 7 from scarlet fever, and 4 from enteric fever. Measles caused a death-rate of 1·2 in East Ham, 2·3 in Sheffield, 6·4 in Rotherham, and 7·0 in Middlesbrough; and whooping-cough of 1·5 in Stoke-on-Trent. The deaths attributed to influenza, which had declined from 3889 to 1361 in the four preceding weeks, further fell to 888, and included 125 in London, 94 in Birmingham, 54 in Manchester, 27 in Sheffield, and 23 each in Bradford and Leeds. There were 6 cases of small-pox, 1027 of scarlet fever, and 1163 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 5, 1010, and 1191 respectively at the end of the previous week. The causes of 43 deaths in the 96 towns were uncertified, of which 12 were registered in Birmingham, 5 in Liverpool, and 4 in Preston.

Scotch Towns (week ended March 22nd).—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had declined from 40·0 to 28·1 in the three preceding weeks, further fell to 22·9 per 1000. The deaths from influenza numbered 33, while in 184 deaths classified as due to other conditions influenza was a contributory cause; in the previous week these numbers were 39 and 257 respectively. The 546 deaths in Glasgow corresponded to an annual rate of 25·5 per 1000, and included 27 from whooping-cough, 7 from measles, 3 each from diphtheria and infantile diarrhœa, and 2 from scarlet fever. The 118 deaths in Edinburgh were equal to a rate of 18·3 per 1000, and included 5 from whooping-cough, 4 from diphtheria, and 1 each from measles and scarlet fever.

March 29th.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality which had declined from 40·0 to 22·9 in the four preceding weeks, further fell to 20·5 per 1000. The deaths from influenza numbered 14, while in 88 deaths classified as due to other conditions influenza was a contributory cause; in the previous week these numbers were 33 and 184 respectively. The 489 deaths in Glasgow corresponded to an annual rate of 22·8 per 1000, and included 31 from whooping-cough, 8 from measles, 7 from infantile diarrhœa, 4 from diphtheria, and 2 from scarlet fever. The 99 deaths in Edinburgh were equal to a rate of 15·3 per 1000, and included 4 from whooping-cough and 3 from measles.

Irish Towns.—The 245 deaths in Dublin corresponded to an annual rate of 31·5, or 5·6 per 1000 below that recorded in the previous week, and included 34 from influenza, 3 each from measles and infantile diarrhœa, and 1 each from whooping-cough and diphtheria. The 207 deaths in Belfast were equal to a rate of 26·9 per 1000, and included 3 from infantile diarrhœa and 1 from diphtheria.

Correspondence.

"Audi alteram partem."

IRELAND AND THE MINISTRY OF HEALTH BILL.

To the Editor of THE LANCET.

SIR,—The new clause setting up an Irish Public Health Council, inserted on March 27th by the Standing Committee of the House of Commons in the Ministry of Health Bill, on the proposal of the Attorney-General for Ireland, may be deemed familiar to your readers, as the text of the proposals has appeared in the daily press. But I should like to point out that the approval given to this clause in the House of Commons has not been general in Ireland, where a deputation, fully representative of the medical profession in Ireland (headed by the Presidents of the Royal College of Surgeons and the Royal College of Physicians), presented to the Chief Secretary, on March 25th, a scheme for the establishment of a Ministry of Health in Ireland. They urged that the Public Health Council should be constituted as follows: (*a*) Four members elected by the county councils, one for each of the four provinces—Ulster, Munster, Leinster, and Connaught; (*b*) four members of the medical profession to be elected by the practitioners of Ireland; and (*c*) four members to be nominated by the Crown. The deputation, through their spokesmen, protested very strongly against the Local Government Board being a part of the Council. They pointed out that all parts of Ireland, and not Dublin alone, should be represented on the Council, and they urged the right of democratic election instead of bureaucratic or Government nomination. The Chief Secretary, as was natural, tried to make some defence of the Irish Local Government Board, of which he is officially chairman, and of which, naturally, from his short residence in Ireland he knows little. He promised to give more medical representation on the Public Health Council, which he said would be only a temporary body, and added, as reported in the press: "If the deputation could assure the unanimous support of the public and the profession for any scheme of health reform, he might then be prepared, in consultation with his Council, to consider such a scheme, and, if approved, to introduce legislation to carry it into effect." In a letter to the press Mr. Maurice J. Hayes, F.R.C.S.I., honorary secretary, Dublin Division of the British Medical Association, criticises very severely this statement, which he calls the "latest sample of official nonchalance." "How can hard-worked doctors start a health campaign," he asks, and "secure the unanimous support of the public for a scheme of health reforms"? And especially how can there be any delay in acting, when the figures published in the "quarterly return" of the Registrar-General for July–August–September, 1918, show the appalling fact that in Ireland there existed an annual birth-rate of only 18·5 per 1000 and a death-rate of

24·6 per 1000, and an infantile mortality of 101·3 of children under one year? The Chief Secretary should act as soon as possible, but the constitution of his "Irish Public Health Council" has lost him the confidence of the Irish medical profession, upon whom will depend the working of any scheme he may in the future carry in Parliament.

I am, Sir, yours faithfully,

April 1st, 1919. F.R.C.S.I.

COLLOIDAL SILVER IN TRENCH FEVER.

To the Editor of THE LANCET.

SIR,—I was interested to see in your issue of Feb. 15th a note by Major J. E. Sweet and Lieutenant H. B. Wilmer, U.S.M.C., on the effect of collargol in trench fever. In the winter of 1916–17 I tried a similar drug on cases of trench fever. The preparation I used was electrargol (argent colloidal électrique à petits grains) prepared by the Laboratoires Clin, Paris. I endeavoured to vary the manner and the time of administration in relation to the phases of the disease. Thus, I gave it intravenously to some of the cases, subcutaneously to others, and by both routes to yet others. I gave it intravenously every third day for three doses; to others intravenously or subcutaneously the day of, or the day before, the expected relapsing pyrexial "spike" or bout. Sometimes I followed this by small daily subcutaneous doses. The dose varied from 5 to 10 c.cm. and the cases (about 30 in all) included examples of the acute and of the subacute (myalgic type) fever. In no single case could I satisfy myself that the drug had any effect at all on the course of the disease; the acute cases continued to have their relapsing bouts of fever and the subacute (myalgic type) their pains.

I remember seeing in the "Daily Review of the Foreign Press" for February, 1918, the note regarding Richter's findings, and I thought that his cases of trench fever and the ones I had dosed must have varied from each other to have given such different results to similar treatment. Perhaps this is the explanation that also underlies Major Sweet's and Lieutenant Wilmer's apparently more successful attempts than mine.—I am, Sir, yours faithfully,

J. H. LLOYD, M.D. Lond.,
Major, R.A.M.C. T.F., 58th C.C. Station.

WOMEN CHIEFS?

To the Editor of THE LANCET.

SIR,—I see that a body called the Women's Watching Council has been pressing for one of the consultative councils to the Ministry of Health to consist solely of women, and for some important appointments on the administrative staff to be similarly reserved.

The position of all present municipal medical employees is that they were appointed under a system where medical men never had to work under medical women; as I think rightly, because the former are vastly more numerous, and the latter, two generations of them, have never made a noteworthy discovery or even written a standard text-book; while there is no living woman with first-rate knowledge of sanitary science. However that may be, I think there will be trouble if the unwritten condition I have alluded to is altered.

I am, Sir, yours faithfully,

March 20th, 1919. W. C. RIVERS.

ACQUIRED IMMUNITY IN INFLUENZA.

To the Editor of THE LANCET.

SIR,—Referring to the interesting question of acquired immunity against influenza raised in your leading article of March 8th, I am of the opinion that undoubtedly an attack of influenza carries with it immunity for a certain time, that the immunity lasts for six months at least, and that the duration of the immunity possibly depends on the severity of the attack. During the last three waves of the epidemic I have had to deal with the sick of 2000 (two thousand) troops, and during this time we treated in hospital over 400 cases. No cases admitted in June, July, or August were readmitted in October, November, or December, and no cases admitted in either of these two periods were readmitted in February this year. Unfortunately, I am unable to trace the cases into March as the troops were changed. Again, in private practice I have had no recurrence. In several instances where some of the household were attacked during the period, October and December, and the other inmates escaped, the position has been reversed in February and March.

My own personal experience also points to there being a distinct immunity. I had a bad attack of influenza in 1890. I ran free through the epidemics of 1891 and 1892, and at that time congratulated myself on being immune. However, I again contracted it the end of 1893, and from that till last May I developed slight attacks each time influenza occurred. Last May I had a very severe attack with a high temperature lasting a week, insomnia, delirium, and patches of broncho-pneumonia. I resumed work in July, so far with complete immunity. My experience makes me, therefore, argue that the duration of immunity depends on the severity of the attack.

I have had very little experience of the immunity conferred by vaccine treatment, but I have had several cases who developed influenza after vaccine treatment, some shortly after the vaccine and some two months afterwards. This rather suggests that a bigger dose of vaccine would give a longer immunity, and that the doses recommended at the conference held at the War Office in October last were far too small.

I am, Sir, yours faithfully,

Mullingar, March 31st, 1919. JOHN GEO. GIBBON, M.D.

CORNS ON BABIES' NOSES.

To the Editor of THE LANCET.

SIR,—Babies, like bull-dogs, have snub-noses to enable them to breathe while holding on to the soft, yielding skin with their mouths. In most babies the shape of the nose—the button-ended, turned-up nose—varies little; but in races in which the parents have a hooked nose the end of the baby's nose is often turned down into a partial "hook."

I once observed this shape in a baby of ancient British lineage. Careful inspection showed a smooth, yellow, flat, horny surface at the tip of the nose which seemed to compress the end into a "hook." After a few days a horny scale separated and the nose assumed the usual shape, "tip-tilted, like the petal of a flower." I have seen two similar cases in hospital patients. The corn reminds one of the bill-scale or "hammer" on the chicken's beak which enables it to break the egg-shell, and is perhaps produced by friction of the baby's hands against the end of the nose in utero. This friction would be favoured by scantiness of liquor amnii or vernix caseosa, as to which I have no notes in the cases mentioned. Perhaps some colleague will supply the deficiency.—I am, Sir, yours faithfully,

HERBERT R. SPENCER, M.D.

Harley-street, W., March 25th, 1919.

HOT LIQUIDS AND CANCER.

To the Editor of THE LANCET.

SIR,—In Mr. D'Arcy Power's interesting Bradshaw lecture on Cancer of the Tongue, of which you gave a report in THE LANCET of Jan 11th (p. 75) no mention is made of the constant thermal irritation to which some tongues are subjected from tea and coffee drinking. Mr. D'Arcy Power's remarks about the increased consumption of tobacco apply also to that of tea and coffee, beverages which are constantly taken hot, and very frequently too hot, and thereby are produced frequent slight irritative thermal injuries on the delicate mucous membrane of the tongue. This thermal injury corresponds closely to that of kangri cancer, and that of the adult male Chinaman who, sitting at the head of his table, is always served first with the hot rice, and being about the only person in China to suffer from carcinoma of the stomach. There can be no doubt but this factor cannot be neglected, more especially as it is notorious that the male tongue is capable of comfortably supporting more irritation from tobacco, hot liquids, curries, &c., than the female tongue. Therefore, summing up, we must state that syphilis, tobacco, thermal irritation, and unhealthy teeth conditions are responsible factors if we wish to adopt prophylaxis in treatment of lingual carcinoma.

I am, Sir, yours faithfully,

M. J. PETTY, jun., M.B. Camb., F.R.C.S. Eng.,
Assistant Surgeon to the Kawson Hospital,
Feb. 20th 1919. Buenos Aires.

NURSING SISTERS AS ANÆSTHETISTS.

To the Editor of THE LANCET.

SIR,—Under war conditions a large number of nurses and of women even devoid of thorough nurses' training have been entrusted with the administration of anæsthetics. It was a case of war necessity. In most cases the qualified operator was able roughly to supervise the actions of his anæsthetist. The help rendered by these women was of the greatest service. It must be clearly realised, however, that an arrangement such as this is only permissible as a *dernier ressort*. The women who have acted thus would themselves be the first to realise the essential difference between acting as an emergency anæsthetist under war conditions and giving anæsthetics in peace time with the responsibilities for choosing and administering the anæsthetics that are rightly imposed upon the professed administrators. At a recent inquest upon a death which occurred during anæsthesia managed by an unqualified woman the jury added a rider to their verdict to the effect that "a medical practitioner should be called in to administer anæsthetics when operations were necessary." In this country such is almost invariably the rule, and I believe it to be a retrograde step to encourage the administration of anæsthetics by nurses specially trained for the purpose, as is largely the practice in some places in America and on the continent. Anæsthetists of this kind must perforce act almost entirely by rule of thumb and are unqualified to meet the emergencies which sooner or later must confront every administrator of anæsthetics. Moreover, the science and art of anæsthesia are little likely to be enhanced by those who have had no thorough medical training.

I am, Sir, yours faithfully,

March 28th, 1919. M.D.

Medical News.

ABERDEEN UNIVERSITY SPRING GRADUATION.—The Spring Graduation of the Aberdeen University took place in the Mitchell Hall, Marischal College, on March 25th. After four and a half years' interruption honorary degrees were once more conferred. Among those receiving LL.D. was Sir James Galloway, K.B.E., M.A., M.D., F.R.C.P., consulting physician, 1st and 2nd Armies, France; two received the degree of M.D., and 13 the degree of M.B., Ch.B. The Principal, in addressing the assemblage, stated that over 2550 of graduates, alumni, and students of the University had joined His Majesty's Forces, besides those who undertook other forms of national service. In consequence of the return of the students to complete their studies, the matriculation roll has been augmented to a large extent, and now stands at 883; the number on the roll in the last year of peace was 1050. At the beginning of next term it is certain the present number on the roll will be largely augmented. The Principal also announced that a committee had met and considered the question of a University war memorial for the men who had fallen. So far those number 296. It is proposed that the memorial shall take the form, first of a roll of all members of the University who have gone on naval or military service, with a separate record containing the brief biographies and portraits of those who have laid down their lives for their country; and secondly of a monument or monuments to their memory within the buildings. Letters were read from Marshal Foch, from Sir Douglas Haig, and from Burgomaster Max accepting the honorary degree of Doctor of Laws.

Following the Graduation, Professor J. T. Cash was met by the medical students of the third, fourth, and fifth year, and presented with a handsome solid silver cigar-box, on which was inscribed:—

"Presented to Professor J. Theodore Cash, M.D., F.R.S., by his students, as a mark of esteem and affection on the occasion of his resignation from the Chair of Materia Medica, March, 1919, Aberdeen University."

Professor Cash suitably replied, and the ceremony concluded by the students singing with great heartiness and unmistakable sincerity, "For He's a Jolly Good Fellow."

The following degrees were conferred at the graduation ceremony:—

DOCTOR OF LAWS.

Sir James Galloway, K.B.E., M.D., F.R.C.P., consulting physician, 1st and 2nd Armies, France; and James Macpherson Wattie, His Majesty's Chief Inspector of Schools, Aberdeen.

DOCTOR OF MEDICINE (M.D.).

Burjorji Sorabji Kanga and Arthur George Reid (commendation for thesis).

BACHELOR OF MEDICINE (M.B.) AND BACHELOR OF SURGERY (CH.B.).

Marjorie Culloden, Alexander Riach Forbes, Norman Burnet Gadsby, Helen Mackay Gray, Hilda Lucy Laidlaw (second-class honours), *Alexander Gavin Morison, Margaret Anne Reid, Ellen Jeannie Saunders, John Skinner, Trevor Alexander Howard Smith, *Violet Marjory Gatford Smith, Hugh Graeme Topping, and Burton Yule (second-class honours).

* Passed Final Professional Examination with distinction.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—H. E. Reburn (Sect. II.), King's Coll. Hosp.; C. de B. Thomson (Sect. II.), Middlesex Hospital; and T. T. Tiplady (Sect. II.), Durham.

Medicine.—H. P. Hodge (Sect. I.), London Hosp.; M. Ibrahim (Sect. II.), Middlesex Hosp.; H. E. Reburn (Sects. I. and II.), King's Coll. Hosp.; and C. de B. Thomson (Sects. I. and II.), Middlesex Hosp.

Forensic Medicine.—O. H. Brown, Charing Cross Hosp.; and H. H. Selim, St. Mary's Hosp.

Midwifery.—C. de B. Thomson, Middlesex Hosp.; and J. B. Williamson, Cambridge and Middlesex Hosp.

The Diploma of the Society was granted to the following candidates, entitling them to practise medicine, surgery, and midwifery: H. E. Reburn, C. de B. Thomson, and T. T. Tiplady.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At examinations recently held the following candidates were successful:—

SECOND EXAMINATION FOR DEGREE OF BACHELOR OF MEDICINE.

Anatomy and Physiology.—Thomas Henry Bates, Cecil Colville Carr, Walter Nigel Crowe, James Ferens Coltman Evangelise Carse, John James Norman Daniels, Edgar Reginald Dingle, John Roland Hetherington, Giles Arthur Michael Hall, Geoffrey Arthur Haydock, Joseph Jackson, Ella Keldan, and George Claudius Edowoo Reffell.

THIRD EXAMINATION FOR DEGREE OF BACHELOR OF MEDICINE.

Materia Medica, Pharmacology, and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology.—Charles Nathaniel Armstrong, John Edmund Basham, Eric Cresswell Dagger, Ibrahim Girgis, George Hall, Norah Hester Hamilton, Gabriel Jonas Dowuona Hammond, Margaret Barbara Herbst, Thomas Harper Kirk, Hugh Ley Puxon Peregrine, and Alice Mary Stenhouse.

LICENCE IN DENTAL SURGERY (*Third Examination*).

Anatomy, Physiology, and Histology; Dental Anatomy, Dental Histology.—James Leslie Liddell.

ROYAL SOCIETY OF ARTS.—A paper on "Housing and Infant Mortality" will be read by Dr. Leonard E. Hill, F.R.S., Director of the Department of Applied Physiology, Medical Research Committee, at the Society's House, John-street, Adelphi, London, W.C. 2, on Wednesday, April 9th, at 4.30 P.M., Sir Thomas Barlow in the chair.

Miss Jane Welsford died at her residence, Mount Pleasant-road, Newton Abbot, on March 17th, in her 105th year. She was reputed to be the oldest inhabitant of Devonshire, being born in the year of the signing of the Treaty of Vienna and of William Hedley's first locomotive engine.

STREATFEILD RESEARCH SCHOLARSHIP.—In accordance with the Trust founded by Mrs. Eliza Streatfeild for the promotion of Research in Medicine and Surgery, a Committee of the Royal College of Physicians of London and of the Royal College of Surgeons of England is proceeding to appoint a Streatfeild Research Scholar in Medicine and Surgery. The emolument will probably be £250 per annum, and the tenure of the Scholarship three years, at the discretion of the Committee. Applications, which should state the nature of the proposed research, the place where it will be carried out, and the status of the applicant, should be addressed to the Registrar, Royal College of Physicians, Pall Mall East, S.W. 1, and marked "Streatfeild Scholarship."

THE FLORENCE NIGHTINGALE HOSPITAL FOR GENTLEWOMEN.—This hospital was founded in 1850 for the gratuitous medical and surgical treatment of ladies of limited means who are quite unable to pay even reduced expenses for a surgical operation. Members of the staffs of general London hospitals, of the Samaritan Hospital for Women, Grosvenor, Soho, Chelsea, New and South London Hospitals may recommend patients, who are eligible, for admission and take charge of them provided that their medical attendance is gratuitous. According to the annual report, 425 patients were admitted during the past 12 months, which, together with the 35 remaining in the hospital at the beginning of the year, makes a total of 460. Of these, 329 were discharged cured, 23 relieved, 8 died, and 33 still remained under treatment at the beginning of 1919. A large proportion of the patients were family connexions of officers of the Army, Navy, and Air Force. There is a deficit on the year's working of £352 and the committee earnestly appeal for financial support. Address, 19, Lisson-grove, London, N.W.

Sir Donald MacAlister has been reappointed a member of the governing body of the Imperial College of Science and Technology.

METROPOLITAN ASYLUMS BOARD: DIPLOMA IN PUBLIC HEALTH.—A course of lectures and demonstrations in hospital administration over a period of three months will be given at the Western Hospital, Seagrave-road, Fulham, London, S.W., by Dr. R. M. Bruce, medical superintendent, on Tuesdays and Fridays at 5 P.M., beginning April 8th. The fee for the course is £3 3s., payable to the clerk to the Metropolitan Asylums Board, Embankment, London, E.C. 4, giving full name and address.

CENTRAL MIDWIVES BOARD.—A special meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on March 20th, with Sir Francis H. Champneys in the chair. Two midwives were struck off the Roll, the following charges amongst others having been brought forward: A child suffering from inflammation of, and discharge from, the eyes, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E. 21 (5); the midwife neglecting to wash the patient's external parts with soap and water and to swab them with an efficient antiseptic solution, as required by Rule E. 8; neglecting to take and record the pulse and temperature of the patient at each visit, as required by Rule E. 14. The midwife not being scrupulously clean in every way, as required by Rule E. 2, and not keeping her register of cases as required by Rule E. 24.

A letter was considered from the Town Clerk of Swansea asking that examination questions for Welsh-speaking candidates should be set in the Welsh language. It was decided that the reply be that the Board cannot undertake to arrange for the setting of papers for examination candidates in Welsh, nor for the oral examination of candidates in that language. It considers that any case of imperfect acquaintance with the English language is adequately met by the presence of a Welsh interpreter at the oral examination at Bristol, as has been the practice for many years.—A letter was considered from the Town Clerk of Liverpool, enclosing a copy of a resolution adopted at a conference between representatives of the Maternity and Child Welfare subcommittee of the city of Liverpool, the Liverpool and District Trained Midwives Association, and the Liverpool Maternity Hospital, relating to the training and education of midwives, and unanimously approved by other bodies, including the Liverpool City Council. The resolution urges that the present low standard of preliminary training and education required from midwives is wholly inadequate and contrary to the best interests of maternity and child welfare. The Board decided that the Town Clerk of Liverpool be informed that the resolution he has forwarded will be taken into consideration on the next revision of the rules.—A letter was considered from the Clerk of the Privy Council with reference to a suggested amendment of the Note at the end of draft Rule E. 12 A, and stating that the Lords of the Council propose to adopt the suggestion. The second part of the Note would then run as follows: "In nearly all districts health visitors and maternity and child welfare centres are provided for the assistance of mother and child." The Board decided that the suggested amendment be approved.—A letter was considered from the clerk of the Cheshire County Council, enclosing a copy of a resolution of the council: (*a*) Calling the attention of the Board to a suggested anomaly arising from the fact that Section 14 of the Midwives Act, 1918, does not enable the local supervising authorities to pay for medical assistance summoned at the request of an uncertified woman; (*b*) asking whether the Board is prepared to construe Section 8 of the Midwives Act, 1918, retrospectively, so as to enable the Board to prohibit, where deemed necessary, a woman whose name has been removed from the Roll prior to Jan. 1st, 1919, from attending women in childbirth. The Board decided that the clerk of the Cheshire County Council be informed (*a*) that the Board notes the terms of the resolution of the county council, but has no power under the Midwives Act or elsewhere to deal with uncertified women; (*b*) (1) that no power conferred by an Act of Parliament can be construed retrospectively unless authority to this effect is specifically conferred by the Act itself; (2) that the powers and duties of the Board extend to certified midwives only, and that the Board has no authority to impose an obligation on a woman who is no longer certified.—A letter was considered from a certified midwife complaining of the difficulty of making a living owing to the action of a district health visitor who is in the employment of a local authority, and is also a certified midwife, carrying on private practice in midwifery at a rate lower than the standard rate of pay for midwifery in that district. The Board decided that the reply be that the Board regrets that it has no power to prevent a midwife holding a salaried post from carrying on a private practice in midwifery at a rate of remuneration lower than the accepted standard in the neighbourhood.

Mr. John Michael Nicholls, L.R.C.P., M.R.C.S., who was returned for the St. Ives district of the Cornwall County Council, has represented his native town on the County Council for 18 consecutive years.

MEDICO-LEGAL SOCIETY.—At a meeting of this society to be held at 11, Chandos-street, London, W., on Tuesday, April 29th, at 8.30 P.M., Dr. Nathan Raw will read a paper on the Position of Medicine in the State.

Dr. C. Lovatt Evans has resigned the chair of Experimental Physiology and Experimental Pharmacology at Leeds University on undertaking research work in the Department of Pharmacology and Bio-chemistry of the Medical Research Committee.

LONDON UNIVERSITY.—**The Senate has adopted a** resolution expressing its appreciation of the valuable work carried out by Dr. Vaughan Harley during 23 years as professor of pathological chemistry. He has resigned the chair owing to ill-health.—The degree of D.Sc. in Biochemistry has been conferred on Mr. E. C. Grey, an internal student, of the Lister Institute of Preventive Medicine, for a thesis entitled "The Enzymes of *B. Coli Communis*"

FACULTY OF INSURANCE.—A National Health Conference of Insurance and other Organisations and Social Workers will be held to-day, Friday, April 4th, in the Central Hall, Broadway, Westminster. The morning session opens at 10.45 and the afternoon session at 2.15. The speakers and subjects for discussion are as follows: Training and Treatment of Disabled Service Men, Right Hon. Sir L. Worthington Evans, M.P., and Captain James O'Grady, M.P.; Medical Research and the State, Sir Walter Fletcher and Major-General Sir W. B. Leishman; Need for Increased State Insurance Benefits, Right Hon. J. H. Thomas, M.P., and Right Hon. John Hodge, M.P.; Women in Their Relation to Health, the Viscountess Rhondda and Mrs. Ogilvie Gordon, D.Sc.

UNIVERSITY COLLEGE HOSPITAL.—**In the absence** of the chairman (Sir Ernest Hatch) Princess Marie Louise presided over the annual meeting of the Governing Committee of the University College Hospital this week. Dr. W. Rigden, in presenting the annual report, remarked upon the exceptionally low cost of maintenance, which amounted to only £1 16*s.* 2*d.* per week per patient. He thought such a low rate was remarkable, considering the high costs maintaining at the present time. The hospital, so far from remaining stationary during the war, had made most marked progress, and women students had been admitted to the Medical School. The Child Welfare Department and the Venereal Diseases Department had performed great State service and were rapidly developing. Since the outbreak of war 6000 soldiers had been treated as in-patients, but the withdrawal of the Government grant on the evacuation of the military wards would materially affect the finances of the hospital, and additional voluntary aid would be sorely needed. A scheme, added Dr. Rigden, was being developed for the appointment of whole-time teachers of medicine and surgery, together with whole-time assistants, and it was hoped that the latter's salaries would be paid by the Board of Education.

WILLIAM GIBSON RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN.—Miss Maud Margaret Gibson has placed in the hands of the Royal Society of Medicine a sum of money sufficient to provide a scholarship of the yearly value of (about) £250 in memory of her father, the late Mr. William Gibson, of Melbourne, Australia. The scholarship will be awarded from time to time by the society to qualified medical women who are subjects of the British Empire, and is tenable for a period of two years, but may in special circumstances be extended to a third year. In choosing a scholar the society will be guided in its choice "either by research work already done by her or by research work which she contemplates. The scholar shall be free to travel at her own will for the purpose of the research she has undertaken." There is no competitive examination, nor need a thesis or other work for publication or otherwise be submitted. The society has power at any time to terminate the grant if it has reason to be dissatisfied with the work or the conduct of the scholar. Applications should be accompanied by a statement of professional training, degrees or diplomas, and of appointments, together with a schedule of the proposed research; and testimonials, one as to academical or professional status and one as to general character, must be included. Envelopes containing applications, &c., should be marked on top left-hand corner, "William Gibson Research Scholarship," and should reach the Royal Society of Medicine not later than Saturday, May 3rd, 1919, addressed to Mr. J. Y. W. MacAlister, Secretary, Royal Society of Medicine, 1, Wimpole-street, W. 1.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Ministry of Health Bill.

THE Standing Committee of the House of Commons on Thursday, March 27th, concluded the consideration of the Ministry of Health Bill, Sir A. WILLIAMSON in the chair.

Inclusion of Ireland.

When the Committee adjourned on Tuesday, a new clause extending portions of the Bill to Ireland, proposed by the Attorney-General for Ireland, was under discussion. At the instance of the Government this was withdrawn and another substituted in the following terms:—

"(1) For the purpose of promoting the health of the people in Ireland and exercising the powers conferred on him by this Act, the Chief Secretary shall be the Minister of Health for Ireland, and it shall be his duty as such Minister to take all such steps as may be desirable to secure the effective carrying out and coördination of measures conducive to health, including measures for the prevention and cure of diseases, the treatment of physical and mental defects, the collection, preparation, and publication of information and statistics relating thereto, and the training of persons for health services.

(2) The provisions of this Act with respect to consultative councils shall apply to Ireland with the substitution therein of the Lord Lieutenant for His Majesty, and with the addition of the following provision: For the purpose of giving advice and assistance and making proposals to the Chief Secretary in connexion with his powers and duties under this Act a Council shall be established (which shall be called the Irish Public Health Council), consisting of the following persons: (*a*) The Vice-President and the two other Commissioners of the Local Government Board for Ireland; (*b*) the Chairman and such two others of the Irish Insurance Commissioners as may be nominated by the Chief Secretary; (*c*) the Registrar-General of Births, Deaths, and Marriages in Ireland; (*d*) a registered medical practitioner, who shall act as chairman of the Council under the direction of the Chief Secretary, and three other registered medical practitioners, one of whom shall be a woman and one of whom shall be a medical practitioner who is registered on the Medical Register in respect of a diploma in sanitary science, public health, or State medicine; (*e*) six other persons having practical experience of matters relating or incidental to or affecting the health of the people.

(3) The Chief Secretary shall from time to time nominate the persons who are to be members of the Irish Public Health Council, under paragraphs (*d*) and (*e*) of the preceding subsection.

(4) The expenses of the Chief Secretary and of the Irish Public Health Council under this Act, including such remuneration of the chairman and other members of that Council as the Treasury may determine, shall be paid in like manner as the expenses of the Ministry.

(5) Save as aforesaid, or as otherwise expressly provided in this Act, the foregoing provisions of this Act shall not apply to Ireland.

Mr. A. W. SAMUELS (Attorney-General for Ireland) explained that the new clause had been drafted to meet as far as possible the strong representations of Irish Members and to make the Health Council thoroughly effective in bringing about a real reform in public health in Ireland.

Captain C. C. CRAIG said that at the conference between the Attorney-General and the Irish Members it was decided that an individual should be appointed whose duty it would be to give his whole time to the question of health, and that he should be known as the Irish Health Commissioner; but that official was hidden away in Paragraph (*d*), and this he regretted very much. He did not think that enough prominence had been given to that gentleman.

Sir W. WHITLA expressed his gratitude to the Attorney-General for Ireland for the amended clause which he had put on the paper. He did not share the regrets of Captain Craig with regard to the registered medical practitioner. "A rose by any other name would smell as sweet." He did not care what he was called. It had been suggested that his name should be inserted in the Bill. He thought he knew who it was to be; it would be the best man that Ireland could possibly produce. He had absolute faith in the Chief Secretary and the Attorney-General making a good selection.

Mr. DEVLIN asked that the names of those who were to constitute the additional members of the Council should be put into the clause. He was glad that the chairman of the Council would be a medical practitioner.

After further discussion, the ATTORNEY-GENERAL FOR IRELAND moved that the words "initiation and direction of research" be inserted in the first subsection after the word "defects."

The amendment was agreed to, and the clause as amended was added to the Bill.

Future Health Policy.

Mr. G. LOCKER-LAMPSON moved a new clause as follows:—

"That the Minister shall have power to set up a standard of different grades of milk and to make regulations for its delivery in sealed bottles; and if any person on selling milk or offering it for sale falls to indicate its standard as so set up or infringes the said regulations he shall be liable on summary conviction to imprisonment for a term not exceeding three months with or without hard labour."

Dr. ADDISON (President of the Local Government Board) intimated that he would like to make a statement in regard to the proposed new clauses as a whole which had been put upon the paper. He said that it was clear that to deal with pieces of local administration, or to add items of a particular set of powers in connexion with one matter or another, would be dealing with the matter in a piecemeal and not in a satisfactory way. If they considered tubercle they wanted proposals, for instance, to deal with tubercle as a whole as far as they could, and to discuss them as a whole. For that reason, while he was in cordial agreement with most of the new clauses, he must say that this was not the appropriate measure in which to deal with them. The Government had given a pledge that they intended to make proposals regarding all health matters as soon as they could after the establishment of the Ministry. The clause which had been formally moved was an excellent illustration of the contention which he was endeavouring to put before the Committee. He dared say that the proposals it made in regard to grading of milk and its delivery in sealed bottles were very important, but he was not at all satisfied that it was the complete story of the powers they ought to take for dealing with milk. Other Departments, such as the Ministry of Food and the Board of Agriculture, were concerned. He suggested that the proper way to deal with the matter was to submit proposals for dealing with it as a whole and to decide who was to deal with it and what their powers were to be. These remarks applied to practically all the new clauses. There was one clause which referred to the power of the Ministry to dispose of money. When Parliament made a grant of money the Minister was thereby authorised to dispose of that money in accordance with the instructions of Parliament. That applied to two of the new clauses. There were other clauses in respect to the Poor-law and voluntary hospitals. That, again, was a section of our public health, and they could not take a little piece out of the Poor-law and deal with it in that Bill. It was quite clear that the medical part of the Poor-law, the Poor-law infirmaries, was the most difficult part of the Poor-law to disentangle from the rest, and it was their first duty, as they were already pledged to get along with that business.

Mr. LOCKER-LAMPSON'S proposed clause was negatived.

Reforms to be Undertaken.

Dr. NATHAN RAW said, as one of those who had put down new clauses, he was bitterly disappointed that these questions were not to be discussed by that Committee, but if the right honourable gentleman would give him a distinct pledge that they would have an opportunity of discussing these reforms at a very early date he would withdraw his new clause providing for the prevention and treatment of tuberculosis as a special disease and to coördinate a national scheme with local and voluntary efforts.

Major ASTOR assured the Committee that no time would be lost in considering all the questions involved. Some of them would be referred to the Consultative Councils.

Mr. LOCKER-LAMPSON said that he would not proceed with the other clauses he had on the paper except the following:—

"If any local authorities do not within a reasonable time avail themselves of moneys or means, or any portion of them, placed at their disposal by, or through the Minister, the Minister may distribute or utilise such moneys or means, or any portion of them as he may think fit."

Dr. ADDISON said that he would see if anything could be done in the matter in a practical way, but he would not pledge himself to any course of action.

Mr. LOCKER-LAMPSON asked the President of the Local Government Board when the grant came up in the House for the purposes of this Bill whether he would put in a proviso in the sense of his clause.

Dr. ADDISON said that he would do so, and the clause was then negatived.

A new clause, in the name of Mr. T. GRIFFITHS, providing that it should be the duty of the Minister to establish a system of national hospitals and other institutions for the treatment of the sick and disabled, including the nationalisation of such existing institutions dependent upon voluntary contributions for their maintenance, was ruled out of order by the Chairman, as it involved a charge on public funds.

After some small alterations had been made in the Schedules the consideration of the Bill was concluded.

On the motion to report the Bill as amended to the House,

Major ASTOR explained that the whole question of hospitals was one which the Minister would have to go into. It was the intention as soon as the Ministry of Health was established to inquire into a large number of questions connected with the health and welfare of the community. As a matter of fact, a start had already been made with a number of proposals.

The motion to report the Bill was agreed to, and the Committee rose.

HOUSE OF LORDS.

WEDNESDAY, APRIL 2ND.

Venereal Infection.

Lord WILLOUGHBY DE BROKE called attention to the spread of venereal infection, and asked the Government how they proposed to utilise recently acquired knowledge with regard to disinfection. He said that he had no desire to belittle moral teaching. He asked whether they had now reached a stage when the question of introducing notification of venereal disease might be reopened, and if he was correctly informed the National Council for Combating Venereal Diseases was approaching the Local Government Board with regard to this matter. The value of disinfection from the medical point of view was incontestable, and it remained for the State to say what means, if any, should be adopted that this disinfection should be available in its best form to the greatest number of persons.

The Archbishop of CANTERBURY, in the course of the debate, emphasised the impossibility of separating the technical and medical side from the moral in approaching the question at issue. He was not afraid of the spread of knowledge if it was given in the right way by the right persons. But there was a grave danger. They could not forget that there was an absolute right and wrong. They might weaken the force of that feeling by giving currency to a presumption that the dangers run in the indulgence in vice could be avoided. As experience in England and abroad had shown it was possible to increase immensely the tendency to go wrong by providing safeguards against uncomfortable consequences. By giving the impression that by certain securities they diminished the danger, they would really increase it by encouraging people to think that they were immune. It was absolutely certain that an increased amount of wrongdoing would follow the freeing of the wrongdoer from alarm. They had to take good heed in what they were doing, and see that they did not for a supposed medical gain do something which set at naught the larger moral questions.

Viscount SANDHURST, replying to the debate for the Government, said that no one could deny the gravity of venereal disease. He understood that the main object of Lord Willoughby de Broke in raising the subject was to obtain publicity for it. He agreed that the first thing they had to do was, as far as possible, to publish the dangers and disadvantages to the present generation and to generations to come. That had been done and was being done. If he did not agree with the conclusions which Lord Willoughby had arrived at, he could assure the noble lord that he would bring everything he had said to the notice of the President of the Local Government Board. Experts sometimes differed. Some processes were still in an experimental stage, and if those referred to possessed the efficacy claimed for them in the hands of instructed persons, could it be assumed that they would have the same efficacy in the hands of the uninstructed. Would they not bring about a sense of security which was not warranted? The Archbishop of Canterbury had emphasised the point that this supposed security would be encouraging illicit intercourse. What had the Government done? The Royal Commission reported in 1916. The result of that was that a very active propaganda was carried on and the county councils were empowered to provide educational lectures and to impart public information. That was done through the National Council which arose out of the Royal Commission. Its activity in publicity had been very great. Leaflets on the subject of the disease, moral responsibility, the use of alcohol, and other aspects were dealt with. That had diffused knowledge of a most useful kind. Leaflets had been issued to sanitary and Poor-law authorities, to prison doctors and chaplains, and to associations of social workers. In conjunction with the War Office the National Council had secured the issue to every man on demobilisation of information of this description and also to munition workers. Mention had been made of the action of the Government in promoting centres and clinics. In addition to 470,000 out-patients there were something like 143,000 bed days. These clinics provided the very best attendance free of expense. They numbered about 140, but a very large number more were required. They should be put in a high state of efficiency with an adequate number of officers and nurses. These centres were also used for the instruction of medical practitioners and for senior students to study and inform themselves with the various ramifications of this horrible disease. In every big town there was a centre for diagnosis. They must be increased. That had been urged on the local authorities, and most of them had fallen in with the scheme. There was still need for speeding up. The real remedy against this disease was self-control. The methods which were being used by the Local Government Board were: (1) Educational campaign, medical, social, and moral; (2) coöperation with the military authorities; and (3) free facilities for the prompt diagnosis provided by the centres.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 26TH.

Ministry of Health and Liquor Control.

Mr. BETTERTON asked the Parliamentary Secretary to the Local Government Board whether the Ministry of Health Bill, as amended in Committee, enabled the powers and duties of the Central Control Board (Liquor Traffic) to be transferred to the proposed Ministry of Health without further statutory authority.—Major ASTOR replied: The Bill as amended in Committee enables any powers and duties of Government Departments in England and Wales (apart from certain powers and duties elsewhere specified in the Bill as suitable for transfer) to be transferred to the Minister by Order in Council, if they relate to matters affecting, or incidental to, the health of the people. No such Order will take effect until it has been adopted with or without modifications by resolution of both Houses; and in any case the powers and duties of the Central Control Board would not appear to be appropriate for transfer under these provisions.

Clinical Thermometer Tests.

Mr. SWAN asked the Parliamentary Secretary to the Ministry of Munitions if the Government was prepared to suspend the Order requiring all clinical thermometers to be tested and approved by the National Physical Laboratory before sale until there was a better supply, in view of the influenza epidemic, and if he would state what steps were being taken to ensure a better supply, and what proportion of clinical thermometers sent to the National Physical Laboratory was rejected.—Mr. KELLAWAY replied: It was found necessary to make the Order owing to the large number of inaccurate instruments which were getting into the hands of the public, and I do not propose to suspend it. In order to develop the supply of these instruments arrangements are made for the manufacture of the necessary kind of glass, and the instrument-makers are given expert advice in the production of the finished article, which is now approximately twice as great as before the issue of the Order. An average of 10 per cent. of the instruments submitted by chemists have been rejected.

Physicians' and Surgeons' War Service.

Viscount WOLMER asked the Secretary for War whether he was aware of the feeling that those physicians and surgeons who had given voluntary service in war hospitals in this country should receive recognition for their services; and whether he would arrange for a list of their names to be prepared.—Mr. CHURCHILL replied: The valuable services of those physicians and surgeons who have given voluntary service in war hospitals controlled by the War Office have not been overlooked, and a "Special Gazette" of the Order of the British Empire published on Feb. 18th last included gentlemen who have rendered services of this nature. Further names are under consideration for the "Honours Gazette" of June 3rd, 1919. It is not possible to prepare a list of all these gentlemen, but the War Office have a comprehensive list of those who have been recommended for recognition in connexion with the 3rd June, 1919, "Gazette," and every endeavour is being made to ensure that deserving services are not overlooked. At this stage, however, the names cannot be divulged.

THURSDAY, MARCH 27TH.

Physical Training in Schools.

Captain LOSEBY asked the President of the Board of Education if he would consider the advisability of appointing a director of physical training to supervise the whole system of physical training of children, more particularly of children attending national schools, throughout the country.—Mr. FISHER replied: The Board for many years past have had on their staff expert inspectors of physical training who work under the chief medical officer. Their inspections are made in all types of schools which receive grants from the Board. I do not think that the establishment of such a post as is suggested is required.

Colonel YATE: Is it not the case that there are only five inspectors, of whom some are women, and that there are no proper inspectors for the boys in physical training?—Mr. FISHER: I will not charge my memory with the actual number of inspectors, but we have a number of organisers of physical training whose duty it is to give instruction to the teachers in the methods of physical training.

FRIDAY, MARCH 28TH.

Nurses' Registration Bill.

Captain BARNETT, in moving the second reading of the Nurses' Registration Bill, reminded the House that the principle of the measure had already been approved by a Select Committee and by both Houses of Parliament. It was a reform that was long overdue. It was remarkable that this country, which was the pioneer in nursing, should in this matter of registration have lagged behind many of our colonies and other countries. In this country there was

nothing more vague in the whole realm of medicine and surgery than the term "nurse." There was a statutory definition of a medical practitioner, a dentist, and a midwife, but a nurse might be the modern counterpart of a Florence Nightingale or of a Sarah Gamp. The Bill, which had been prepared at the instance of the Central Committee for the State Registration of Nurses, representing not less than 30,000 medical practitioners and nurses, proposed to establish a General Nursing Council for the training and registration of nurses in the United Kingdom. The council would consist of persons representing the Privy Council, the Local Government Board, associations of registered medical practitioners, the nurses' training schools, and elected representatives of the nursing profession. There ought to be representation of the lay element, but in the interest of the nurses he thought it should not be predominant. As the General Council could not be set up at once the Bill provided for a provisional council which would hold office for two years and would prepare rules and regulations which were to govern the profession of nursing and deal with the formation of a register of nurses. Rules drawn up by the General Council would be subject to the approval of the Privy Council. Divisional boards would be set up in Wales, Scotland, and Ireland, and there would be an appeal from them to the General Council. There would be an interregnum period of three years during which any person who was *bona fide* carrying on the profession of a nurse would be entitled to claim registration. Those who had been trained as nurses under regulations authorised by the Army Council for soldiers of the Royal Army Medical Corps and by the Admiralty for the sick-berth staff of the Royal Navy would be entitled to be put on the register. Registration was not compulsory, but once the standard of qualification had been established no nurse would be able to call himself or herself a registered nurse unless they were registered. The Bill would provide for a standardisation of training and qualification which would be in the interests of the hospitals, and especially of the smaller ones. After the expiration of three years anyone would be entitled to be registered provided that he or she was a British subject and 21 years of age and had had not less than three years' training under a definite curriculum prescribed by the council. As regarded finance, there was no idea of making any demand on the public purse, nor were the nurses asking for charity. It was estimated that there were 80,000 practising nurses in the United Kingdom, and that 50,000 would register in the first year. If there was a professional fee of two guineas that would mean 100,000 guineas, which, invested, would provide 5000 guineas, and this, together with new fees and examination fees, would provide a sufficient income to carry out all the purposes of the Act. He appealed to the House to give a second reading to the measure, leaving details to be dealt with in Committee.

Sir DONALD MACLEAN supported the second reading of the Bill. Some such measure, he said, was needed as a complement to the Ministry of Health Bill. It would, however, require careful attention in Committee. Some earnest medical reformers held that the training of nurses should not be less than three years. In the London Hospital, however, he understood that the training was only about two years, and a more skilled and zealous body of nurses were not to be found in the United Kingdom. There were people who were, he would not say fanatics, but inclined to go too far on these matters. It would be necessary to bring within the ambit of the Bill all reasonably qualified women. He thought that a State grant of £2000 a year would be one of the most productive forms of expenditure the Government could undertake. There was no hope for the Bill unless the Government took it up, and he advised Members to make the life of the Government so uncomfortable that they would accept it as part of their legislative programme.

In the debate which followed several Members welcomed the Bill. Emphasis was laid upon the debt which the Empire owed to our nurses for the splendid work they had done during the war in coöperation with the medical profession.

Sir WATSON CHEYNE, in appealing to the Government to take the Bill under their own ægis, reminded the House that nursing was an absolute essential of a healthy community. The present remuneration of nurses was deplorably bad. The registration of nurses was exceedingly important from the point of view of the public, because in many cases nurses were sent out to cases who had had no proper training at all.

Such objection as there was to the measure was voiced by Mr. RAWLINSON and Colonel WEDGWOOD. The former said he had never believed in the State registration of nurses, and the debate had not convinced him that it was the best way of accomplishing the end which all had in view. He suggested that the best thing to do would be to have an official directory of nurses, in which would be stated the qualifications of each nurse and the teaching she had received; and secondly, to authorise every training institution to copyright its nurses' uniform. The objection to State registration was that it would reduce all nurses to a common level. Colonel Wedgwood's objection to the Bill was that it would narrow the field of supply of nurses and the avenues by which women approached the nursing profession. He did not, however, oppose the Bill.

Major ASTOR said he was sure that anything which improved the status and efficiency of the nursing profession must tend to the success of the Ministry of Health. The Government were generally in favour of the principle of the Bill. There was another Bill, the sponsors of which had not been so successful in the ballot as the sponsors of this measure. The points on which they differed would be considered in Standing Committee when that body dealt with the Bill before the House. He suggested that the Bill should be read a second time. It could then be examined, criticised, and amended in Committee. The attitude which the Government would afterwards take up towards the Bill must depend on the shape in which the measure was returned to the House.

The Bill was then read a second time.

TUESDAY, APRIL 1ST.

Tuberculous Officers.

Sir WATSON CHEYNE asked the Secretary of State for War if he would state how many officers are still in the Army who were suffering from pulmonary tuberculosis; how many suffering from pulmonary tuberculosis had been discharged from the Army since August 4th, 1914; how many officers and ex-officers, suffering from pulmonary tuberculosis had been given appropriate treatment since August 4th, 1914; and how many officers and ex-officers suffering from pulmonary tuberculosis were at present under treatment, and what kind of treatment they were receiving.—Captain GUEST (Joint Parliamentary Secretary to the Treasury) replied: The only figures available are those relating to ex-officers, which are in the records of the Ministry of Pensions. I am informed that the number of officers discharged on account of pulmonary tuberculosis since August 4th, 1914, of which the Ministry of Pensions have record, is 615. All of these have been offered treatment, but 20 have not accepted. The number of ex-officers at present under treatment is 449, made up as follows: In sanatoriums, 152; convalescing at the coast or in the country, 41; under treatment at home, 256. I understand that special reference to all commands at home and abroad would be necessary in order to obtain the figures as regards serving officers. As regards the last part of the question, I can assure my honourable friend that all officers suffering from this disease are receiving appropriate treatment.

Scottish Board of Health Bill.

Mr. MUNRO (Secretary for Scotland), in moving the second reading of the Scottish Board of Health Bill, said he recognised the superficial arguments in favour of the appointment of a separate Minister of Health for Scotland, but he had no hesitation in adopting the alternative that the Secretary for Scotland should be head of the Scottish Board. It was of the first importance that the head of the new Health Board should be a Cabinet Minister and be in touch with the Treasury. The Secretary for Scotland fulfilled these requirements, whereas a separate Minister of Health would not. It was proposed to appoint a Parliamentary Under Secretary, who would be responsible under the Secretary for Scotland for the administration of the new Board. The Secretary for Scotland would be President of the Board and the Parliamentary Under Secretary would be Vice-President. The Board would consist of three appointed members, two of whom would be medical men, a lawyer, who might be either a solicitor or an advocate of ten years' standing, the Secretary for Scotland *ex-officio*, two of the four Insurance Commissioners selected by the Secretary for Scotland, and at any rate, one woman. The chairman would be appointed by His Majesty on the recommendation of the Secretary for Scotland. He had endeavoured to make the transfer of powers which was to take place immediately as comprehensive as possible. He would not like to tie himself to the precise duties which might hereafter be taken over by Order in Council. Careful consideration had been given to the suggestion that the powers and duties of the Scottish Education Department in respect to medical inspection and treatment of children and the powers and duties of the Minister of Pensions with respect to disabled officers and men who had left the service should be transferred at once. But there were difficulties, both financial and administrative, which stood in the way of doing that. He thought that the matter affecting the Education Department should be left over for future consideration. With regard to the point affecting the Pensions Ministry, he was assured that the schemes were not sufficiently developed at the present moment, although it might be quite appropriately done by Order in Council at no very distant date. The provisions regarding consultative councils resembled those in the English Bill. He had a very strong and

firm belief in councils of this kind. The Bill provided that on these councils there should be women as well as men. The question of the Poor-law was dealt with in precisely the same way as the English Bill dealt with the matter. The Poor-law manifestly required revision, but it would be overloading and impeding the Bill, which did not admit of delay, if it were dealt with in it. The intention was, however, at the earliest moment to eradicate from health administration what had come to be known as the taint of the Poor-law. He wished it had been possible in that Bill to deal with local as well as central administration of health matters. He hoped the time was not far distant when the matter could be tackled, but in the meantime it would be a profound mistake to delay this measure by the inclusion of provisions of that sort which might be contentious in their character.

The Bill was read a second time.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

A. G. McKee to be Surgeon Lieutenant.

ARMY MEDICAL SERVICE.

Col. C. J. MacDonald is placed on retired pay.

To be temporary Colonels: Temp. Lieut.-Col. C. M. Wenyon and Lieut.-Col. S. G. Barling, R.A.M.C. (T.F.).

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. F. W. Hardy is placed on the Half-pay List on account of ill-health contracted on active service.

Temp. Major H. F. Woolfenden relinquishes the acting rank of Lieutenant-Colonel on re-posting.

Capt. (acting Major) H. Burrows, R.A.M.C. (T.F.), to be temporary Lieutenant-Colonel.

Capts. acting Majors) A. M. McCutcheon and F. T. Turner are placed on the Half-pay List on account of ill-health contracted on active service.

Officers relinquishing their commissions: Temp. Lieut.-Cols. C. G. Douglas (retains the rank of Lieutenant-Colonel), J. Gott. Temp. Major W. J. Orr (on ceasing to be employed with 1st Birmingham War Hospital, and retains the rank of Major). Temp. Capt. W. Angus (granted the rank of Lieutenant-Colonel). Temporary Captains granted the rank of Major: C. Sullivan, J. D. Dunlap, L. R. Broster, W. R. Wilson, W. M. Buchanan, S. W. Woollett, J. H. Thornley, H. Pringle. Temporary Captains retaining the rank of Captain: J. Tait, B. R. Vickers, R. V. Howell, C. E. Tangye, R. C. Allen, R. C. Leonard, A. D. Campbell, C. F. Harford, J. B. Orr, R. Robertson, G. C. Birt, J. M. Barkley, A. Kerr, L. U. Geraty, G. B. N. Flanagan, J. T. Kitchen, H. S. Thomas, A. Naismith, H. C. Addison, D. A. Chamberlain, J. Butler, M. H. Fleming, L. Bensted, D. A. Crow, J. H. D. Webster, J. B. Rae, A. H. G. Burton, H. D. Woodroffe, A. W. M. Sutherland, A. E. Burroughs, J. A. Thomson, B. R. Billings, M. Donaldson, J. A. Jamieson, R. E. Ingram-Johnson, J. I. Arnold, W. E. Passmore, T. J. Buckley, J. E. Judson, J. Carrick, A. Graham-Stewart, A. W. Baker, L. L. Phillips, R. Craig, P. Hall-Smith, H. St. J. Randell, J. Wells, H. E. Moore, G. H. Joseph, J. M. S. Wood, K. Pretty, E. D. Smith, W. Harmens, J. C. Dunn, G. Y. Richardson, A. Davies, W. Kelsey-Patterson, R. Donald, T. McL. Galloway, L. H. I. Bell, F. G. Bergin, A. W. C. Lindsay, A. C. Dixon, D. Clow, W. P. Cornwall, R. Fell, F. M. S. Hulke, W. D. Chambers, W. A. Ferguson, F. E. Chapman, T. W. David, F. W. Twort, J. T. Smeall, H. L. G. Hughes, W. Amsden, C. Bluett, F. Dillon, E. S. Holloway, I. Ogilvie, W. Paul, K. C. Middlemiss, R. H. Urwick, J. Laing, D. Walker, D. Brough, E. G. Pringle, T. F. O'Kell, B. S. Taylor, F. L. Pelly, J. A. MacLaren, S. H. Sweet, R. Nicoll, J. A. Liley, A. H. Turner, E. C. White, J. H. H. Pearson, S. S. Rendall, A. Muir, R. M. Menzies, A. T. Wysard, W. D. Ross, J. T. Hefferman, A. Bloom, C. O'Brien, A. J. W. Compton, A. P. Nicolle, T. F. Moran, R. J. P. Waugh, J. B. Cooke, W. Elwood. Temporary Lieutenants retaining the rank of Lieutenant: R. Tilbury, H. E. Thompson, W. A. S. Magrath, F. H. Boone, W. P. McCowan, C. O. Muler, J. A. B. Hicks, S. Bardal, J. Grimson. Temporary Honorary Lieutenant J. Todesco.

A. O. Raymond, late temporary honorary Lieutenant, is granted the rank of Lieutenant.

SPECIAL RESERVE OF OFFICERS.

Captains relinquishing the acting rank of Major on re-posting:—A. J. Gibson, M. W. Paterson, G. Marshall.

Captains to be acting Majors: G. S. Mather, J. F. W. Meenan, J. B. Hanna.

Capt. C. D. Pullan relinquishes his commission and retains the rank of Captain.

Lieutenants to be Captains: T. L. Crawhall, D. J. A. Lewis, H. E. Bamber.

TERRITORIAL FORCE.

Lieut.-Col. C. R. Laurie relinquishes his commission and retains the rank of Lieutenant-Colonel.

Majors (acting Lieut.-Cols.) relinquishing their acting rank on ceasing to be specially employed: H. Fulton, F. W. Johnson, J. W. Leitch, E. H. Cox, R. Coffee. Capts. (acting Majors) H. O. McGrath, R. S. T. Tatlow.

Major R. C. Rodgers is restored to the establishment.

Captains (acting Lieut.-Cols.) relinquishing their acting rank on ceasing to be specially employed: P. Moxey, W. L. Robertson, A. T. Falwasser, D. G. Rice-Oxley. Captains (acting Majors) W. P. Ferguson, C. E. K. Herapath, G. W. Deeping, W. A. Valentine, G. W. Shore, F. H. C. Watson, J. Arthur, A. J. Blaxland, C. J. Fox, R. M. Wilson, A. L. Yates.

Capt. D. C. Bremner to be acting Major whilst specially employed.

Capt. J. S. Pearce relinquishes his commission and retains the rank of Captain.

Capt. J. W. G. H. Riddel to be a Deputy Assistant Director of Medical Services, and to be acting Major whilst so employed.

Capt. C. B. Stewart relinquishes his commission on account of ill-health, and retains the rank of Captain.

Capt. A. Innes to be Major.

Captains (acting Majors) to be acting Lieutenant-Colonels whilst specially employed: R. Knight, J. G. Hill, G. E. G. Mackay.

Captains to be acting Majors whilst specially employed: J. Ramsay, F. G. Prestwick, W. Goldie, J. Arthur.

ROYAL AIR FORCE.

Lieut.-Col. C. B. Heald to be Lieutenant-Colonel.

Medical Branch.—The undermentioned are transferred to unemployed list: Capts. W. A. Simpson, E. P. Carmody, H. R. Carter, (acting Major) L. Hooper, J. P. J. Harty, J. P. Walker, B. E. Annoot, (Hon. Lieut.-Col.) J. MacLaughlin, E. A. Wilkinson, (acting Major) A. A. Bisset, R. W. W. Jones, E. P. Chennells, T. S. Regan, L. C. Rivett, A. B. Bradford, N. F. Lloyd, A. H. L. Thomas, H. P. Helsham; Lieuts. R. Malcolm, W. A. Cooper, H. McP. Cargin, K. Britten, C. A. E. Cook, G. A. Roper, A. Read, J. D. George, H. T. Rymer, J. S. Harbinson.

Temporary Lieutenants to be temporary Captains: W. D. Ross, T. M. O'Donnell, G. O. Grain, A. B. Cooke, F. E. Webb, S. E. Murray, W. H. Ross.

J. McP. Mackinnon to be temporary Captain.

Dental Branch.—Lieut. H. N. Hillier is transferred to unemployed list.

INDIAN MEDICAL SERVICE.

The King has approved the promotion of the following officers:—Colonel to be Major-General: H. Hendley. Captains to be Majors: C. H. Cross, R. A. Chambers, N. S. Simpson, K. S. Singh, A. S. Leslie, A. P. G. Lorimer, and H. B. Scott. Temporary Captains to be Captains: N. Briggs, H. S. Anand, J. L. R. Philip, W. J. S. Ingram, R. H. Malone, and S. D. Sondhi. Lieutenants to be Temporary Captains: P. Verdon, L. S. Ramier (since deceased), and J. G. Bird. Temporary Lieutenants to be Temporary Captains: P. N. Mitra, N. R. Satpute, N. A. Quraishi, V. R. Nagarkar, P. Pant, J. M. Guilfoyle, A. Das, K. Bhatia, R. R. M. Anand, P. M. T. Khan, B. I. H. Joachim, S. S. Duggal, J. C. Dhunjibhoy, K. S. Patel, J. S. Galvin, E. C. Brooks, J. S. Kanga, A. R. Lester, C. L. D. Roberts, R. K. Dewan, C. M. Kikani, T. K. Nayar, N. K. Desai, A. J. Abreu, D. L. Kaka, M. V. Menon, N. M. Bodas, D. D. Kapur, J. B. Rodrigues, S. F. Bisni, W. Valladares, M. V. Pathak, A. Campbell, J. F. de Souza, N. A. Dalvi, K. B. Chowdury, N. N. Joshi, J. A. A. D'Souza, D. M. Bhatavadekar, N. K. Arjani, K. V. Tolat, H. J. Andrews, M. M. Maitra, L. M. Banerjee, B. L. Gupta, H. K. Dikshit, V. D. Saxena, R. Chandra, C. G. N. Singh, N. W. Modak, C. Khanna, N. B. Mukharji, G. R. Charnalia, P. V. Cheriyan, V. P. Limaye, A. da G. Barreto, M. Prasad, W. M. D'Souza, H. F. Manecksha, S. M. A. Faruki, B. B. Gatgil, G. Singh, R. N. Agtey, M. L. Deb, R. S. Sharma, J. Ezekiel, D. P. Bhargava, U. M. Gupta, D. John, A. N. Sharma, N. Kishor, M. Fazl-ud-Din, G. C. Maitra, P. N. Basu, A. S. Varma, K. N. Goyal, M. N. Pal, S. Ghosh, Z. H. Jafri, H. A. Alavi, J. M. Sikdar, S. C. Bhattacharya, J. P. Richardson, K. M. Anantan, S. Lal, P. K. Bardhan, S. N. Kapur, H. Ram, P. Mukerji, U. Annantthaya, N. M. Pal, D. D. Khanna, B. B. Shah, P. C. Guha, H. C. Mitter, R. C. Basu, G. C. Ray, N. Phani, D. R. Bhalla, B. B. Mallik, L. Das, A. K. S. Gupta, P. R. Gupta, K. C. Dube, L. Castellino, H. T. Hathiramani, U. S. Gupta, G. R. D. Rau, B. S. Gill, S. P. Das, B. S. Tarapore, R. Prasad, K. K. Banarji, and K. Dad.

Appointments.

BRIMBLECOMBE, S. L., L.R.C.P. Lond., M.R.C.S., has been appointed Assistant School Medical Inspector to the Somerset Education Committee.

FOX, H. C., M.B., Ch.B. Edin., Senior House Surgeon at the Blackburn and East Lancashire Royal Infirmary.

LEARY, G. F. V., M.B., Ch.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Castlederg District of the county of Tyrone.

ROGERS, W. G., M.B., B.S. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Broughton Astley District of the county of Leicester.

TOULMIN, A., L.R.C.P. Lond., F.R.C.S. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Preston (East) District of the county of Lancaster.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen City, Mother and Child Welfare.—M.O. £500.

Aberdeen Royal Infirmary.—Asst. Phys. and Two Asst. Surg. Also Three Res. M.O.

Banff, Duff House.—Asst. Phys. £100.

Bath Royal Mineral Water Hospital.—Res. M.O.

Bedford County Hospital.—H.S. £175.

Belfast, Queen's University.—Prof of Anat. £900.

Belgrave Hospital for Children, Clapham-road, S.W.—Res. M.O. £75.

Birmingham and Midland Eye Hospital.—H.S. £200.

Bombay, Municipal Corporation of the City of.—Exec. Health Officer. Rs. 500 to Rs. 2000 monthly.

Bradford Children's Hospital.—H.S. £170.

Bradford City Health Department.—Asst. M.O. £400.

Bristol General Hospital.—Dent. H.S. £250. Also Med. and Surg. Registrars.

Burton-on-Trent Infirmary.—Res. H.S. £200.

Buxton, Derbyshire, Devonshire Hospital.—Asst. H.S. £120.

Cardiff City.—Female Asst. M.O. £400.

Central London Ophthalmic Hospital, Judd-street, St. Pancras.—Pathologist. £75.

Chelsea Hospital for Women, Arthur-street, Chelsea, S.W.—Surg.

Croydon General Hospital.—Res. H.S.

Derbyshire Hospital for Sick Children.—Female Res. M.O. £150.

Dewsbury and District General Infirmary.—H.S. £250.

East London Hospital for Children and Dispensary for Women, Shadwell, E.—Asst. Phys. Also M.O. for Electrical Department.

Falkland Islands.—Colonial S. £400. Also Colonial Dent. S. £400.
Fiji Medical Appointments.—Five M.O £300.
Glamorgan County Asylum, Bridgend.—Fourth Asst. M.O. £400.
Guildford, Royal Surrey County Hospital.—H.S.
Hammersmith Parish.—Dist. M.O. and Pub. Vac. £150.
Herefordshire General Hospital.—H.S. £200. Also Two Hon. Phys.
High Carley Sanatorium, nr. Ulverston.—Asst. Tuberc. M.O. £350.
Hospital for Women, Soho-square, W.C.—Res. M.O. £100.
Hull City Asylum.—Second Asst. M.O. £250.
Jarrow Borough.—M.O.H. £750.
Lancashire County Council.—Two Asst. Disp. Tuberc. Officers. £550.
Lincoln Mental Hospital, The Lawn, Lincoln.—Asst. M.O. £250.
Lochgoilhead and Kilmorich Parish.—M.O. and Vac. £300.
London Homœopathic Hospital, Great Ormond-street and Queen-square, W.C.—Res. M.O. £80.
Manchester Children's Hospital, Pendlebury, Gartside-street.—Asst. M.O. £200.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—Res. Surg. £200.
Melbourne, Australia, Walter and Eliza Hall Institute of Research in Pathology and Medicine.—Med. Research Director. £1000. Also First Asst. £600.
Metropolitan Hospital, Kingsland-road, E.—H.P., H.S. £100. Also Asst. H.P. and Asst. H.S. Also Clin. Asst. to Dent. Dept. 25 g.
Middlesbrough County Borough.—Female M.O. for Maternity and Child Welfare. £400.
Newcastle-upon-Tyne, City Hospital for Infectious Diseases, Walker Gate.—Res. M. Asst. £250.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Res. appointments. £50, except H.S. to Out-patient Depart.—£100.
Newcastle-upon-Tyne, Royal Victoria Infirmary and the University of Durham College of Medicine.—Asst. to Prof. of Path.
Newcastle-on-Tyne, University of Durham College of Medicine.—Demonstrator of Anatomy. £300 to £400.
Newport, Mon., Royal Gwent Hospital.—Res. M.O. £250.
Northampton General Hospital.—H.P. £200. Also Hon. Surg. and Two Hon. Asst. Surg.
Northamptonshire County Council.—Female M.O. £400.
Nottingham General Hospital.—Cas. H.S. £250.
Plymouth, South Devon and East Cornwall Hospital.—H.P. £150.
Richmond, Surrey, Royal Hospital.—H.S. £150.
Rochdale Infirmary and Dispensary.—Jun. H.S. £100.
Royal Free Hospital, Gray's Inn-road, W.C.—Res. Asst. Anæsth. £50.
St. Bartholomew's Hospital.—Asst. Administ. of Anæsth.
Saint Lucia.—M.O. £350.
Seychelles Government.—Asst. M.O. and Visiting Magistrate. £200.
Sheffield City Education Committee.—Asst. School M.O. £400.
Sheffield, East End Branch of the Children's Hospital.—H.S. £150.
Sheffield Royal Hospital.—Cas. O. £130.
Sheffield Royal Infirmary.—Res. S.O. £200.
Sheffield University.—Demonstrator for Department of Pathology and Bacteriology. £300
Southampton, Free Eye Hospital.—H.S. £150.
Straits Settlements Government.—Six M.O. £350.
Swansea County Borough.—Asst. M.O. £500 and £400.
Weihaiwei Government.—Jun. M.O. £400.
Wellington College, Berkshire.—M.O. £800.
Wigan Infirmary.—Jun. H.S. £225.
Wilts County Council General Education Committee.—Dent. Surg. £300.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Clay Cross (Derby), Glasgow (S.E.) (Lanark), Hinckley (Leicester), Staveley (Derby), and Tollcross (Lanark).

Births, Marriages, and Deaths.

BIRTHS.

GREEVES.—On March 24th, the wife of R. Affleck Greeves, F.R.C.S., of a daughter.

HOFFMANN.—On March 25th, at 2, Nottingham-place, W.1, the wife of Captain Geoffrey Hoffmann, R.A.M.C., of a daughter.

ROCHE-KELLY.—On March 17th, at Compayne-gardens, Hampstead, the wife of Captain J. R. Roche Kelly, R.A.M.C., of twin daughters.

STIDSTON.—On March 20th, 1919, at 14, Waterloo-road, Wolverhampton, to Dr. and Mrs. C. A. Stidston, a daughter.

MARRIAGES.

SCROGGIE—MCLELLAND.—On March 20th, at Mayfield United Free Church, Edinburgh, Major Frank H. Scroggie, M.C., R.A.M.C. (T.F.), to Agnes Moffat McLelland, daughter of T. G. McLelland, Johannesburg, South Africa.

WESTMORLAND—CLIFFE.—On March 29th, at St. John's, Marchwood, Hants, Captain A. S. Westmorland, R.A.M.C., to Barbara Mary, younger daughter of M. W. Cliffe, of Southsea, Hants.

DEATHS.

BROWN.—On March 27th, on his way home from Mesopotamia, Captain Wilfrid S. Brown, R.A.M.C.

CUNLIFFE.—On March 31st, 1919, at the Officers' Hospital, Windermere, Ernest Nicholson Cunliffe, of Manchester, Major, R.A.M.C. (T.F.), M.D., B.S. Lond., M.D. Vict., M.R.C.P. Lond., aged 41 years.

POTTS.—On March 14th, at Palace Pound, Ross, Herefordshire, James Ashford Potts, M.B., C.M., aged 63.

STIRLING.—On March 20th, in South Australia, Sir Edward Charles Stirling, of Adelaide, C.M.G., F.R.S., M.D. Cantab., F.R.C.S., in his 71st year.

STURGE.—On March 27th, at Icklingham Hall, Mildenhall, Suffolk, William Allen Sturge, M.V.O., M.D., F.R.C.P., aged 68.

TOWNSEND.—Previously reported wounded and missing, on March 24th, 1918, now reported killed in action on that date, near Rocquigny, Captain Thomas Ainsworth Townsend, M.C. and Bar and Order of St. Sava, R.A.M.C.(T.), 1/20th London Regiment.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.1.

Wednesday, April 9th.

Reception to the British Medical Association.

MEETINGS OF SECTIONS.

Tuesday, April 8th.

PSYCHIATRY (Hon. Secretaries—Bernard Hart, G. F. Barham): at 5.30 P.M.

Paper:—Dr. William Brown: A Comparison of Early Cases of "Shell Shock" seen in the Field with those seen at the Base.

Friday, April 11th.

CLINICAL (Hon. Secretaries—David Forsyth, T. P. Legg): at 8 P.M.

As it is desired to make this meeting of the Section specially attractive, it is hoped that Members will show any cases of unusual interest or of rare conditions they may have under their care. The Hon. Secretaries will be glad to receive particulars as soon as possible.

The Royal Society of Medicine keeps open house for medical officers of all the Allied Forces, and invites them to make free use of its library and rooms. The Emergency Post Graduate Scheme, under the charge of the "Fellowship of Medicine," is also open to all medical officers. Particulars of this will be supplied by the Secretary Fellowship of Medicine, 1, Wimpole-street, London, W.1.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

MONDAY, April 7th.—4.30 P.M., Cantor Lecture:—Prof. H. E. Armstrong: Problems of Food and their Connexion with our Economic Policy. (Lecture II.)

WEDNESDAY.—4.30 P.M., Paper:—Dr. L. E. Hill: Housing and Infant Mortality.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY, April 8th, & THURSDAY, 10th.—5 P.M., Lumleian Lectures: Sir H. D. Rolleston, K.C.B.: Cerebro-spinal Fever.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

Special Eight Weeks Course of Post-Graduate Instruction. (Details of the Course were given in our issue of Feb. 15th).

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.

TUESDAY, April 8th.—3 P.M., Lecture IV.:—Prof. A. Keith: British Ethnology—The People of Wales.

THURSDAY.—3 P.M., Lecture II.:—Prof. A. Findlay: Colloidal Matter and its Properties.

FRIDAY.—5.30 P.M., Prof. Sir J. J. Thomson, O.M.: Piezo Electricity and its Applications.

Communications, Letters, &c., to the Editor have been received from—

A.—*L'Avenir*, Paris; Mr. R. J. Albery, Lond., Air Council; Dr. A. Abrahams, Aldershot.

B.—Board of Agriculture and Fisheries, Lond; Dr. W. Balgarnie, O.B.E., Winchfield; Miss C. M. Brown, Lond; Dr. J. S. Bolton, Nottingham, Dr. W. Buckley, Lond.; Dr. J. Blomfield, O.B.E., Lond.; Board of Education, Lond.; Dr. M. Benaroya, Lond.; Dr. J. P. Briscoe, Boscombe.

C.—Capt. W. E. Cooke, R.A.M.C.; Dr. I. G. Cobb, Lond.; Dr. W. F. Croll, Aberdeen; Child-Study Society, Lond., Sec. of.

D. Mrs. Grace H. G. Dundas, Chadwell Heath; Dr. J. F. H. Dally, Lond.; Dr. R. Donald, Lond.; Dr. F. H. Diggle, Edinburgh.

E.—Col. T. R. Elliott, A.M.S.; Dr. H. A. Ellis, Middlesbrough; Mr. R. Eccles-Smith, Mutley.

F.—Dr. H. French, Lond.; Dr. F. Fergus, Glasgow; Dr. E. Folley, Paris; Capt. J. G. Forbes, R.A.M.C.; Food Investigation Board; Faculty of Insurance, Sec of.

G.—Dr. J. C. Gibbon, Mullingar; Dr. M. Greenwood Lond.

H.—Mr. J. T. Henderson, Pietermaritzburg; Lieut. Col. C. B. Harrison, I.M.S. (retd.); Dr. Hirschfeld, Salonica, Humanitarian League, Lond.

K.—Mr. H. Kimpton, Lond.

L.—Mr. P. E. Leftwich, Lond.; Dr. P. Lasablière, Paris; Dr. C. E. Lea, Frimley; Major J. H. Lloyd, R.A.M.C., London Insurance Committee.

M.—Metropolitan Asylums Board, Lond., Clerk to; Medical Sickness, Annuity, and Life Insurance Friendly Society, Lond.; Mr. G. Mayall, Bolton; Capt. D. M. Marr, R.A.M.C.(S.R.) Capt. W. Macadam, R.A.M.C.; Dr. H. A. Mackewen; Lieut.-Col. C. S. Myers, R.A.M.C.; Malay States Information Agency; Dr. E. W. G. Masterman, Lond.; Mr. C. MacMahon, Lond.

N.—North of England Tuberculosis Society, Newcastle-upon-Tyne, Hon. Sec. of.

O.—Dr. Orchard, Kingussie; Dr. G. W. Ord, Bexhill.

P.—Mr. M. J. Petty, Buenos Aires; Miss K. Pilkington, Lond.; Mr. C. A. Pannett, Lond.; Panel Committees Association, Sec. of; Capt. A. H. Priestley; Dr. J. A. P. Perera, Sheffield.

R.—Mr. H. Runcle, Southsea; Dr. J. D. Rolleston, Lond.; Lieut.-Col. H. B. Roderick, R.A.M.C.(T.); Research Defence Society, Hon. Sec. of; Royal Society of Arts, Sec. of; Royal Institution, Sec. of; Dr. R. J. Rowlette, Dublin.

S.—Dr. H. Spencer, Lond.; Society of Apothecaries of London, Sec. of; Prof. J. W. W. Stephens, Liverpool; Col. C. Symonds, C.B., A.M.S. Prof. W. Stirling, Manchester, Dr. A. G. Shera, Netley; Dr. R. B. Sherlock, Darenth, Dr. G. E. Smith; Miss M. Stone Manchester.

T.—Dr. R. H. Tweedy, Dublin.

U.—University of Dublin.

V.—Dr. A. L. Vischer, Bale; Dr. H. M. Vernon, Oxford; Mr. R. M. Vick, Lond.

W.—Mr. J. Wollen, Hampton-on-Thames, Dr. A. H. Williams, Coward; Bt.-Major W. J. Wilson, R.A.M.C.(T.F.(R)) West London Medico-Chirurgical Society, Dr. J. P. Wilmshurst, Folkestone; Surg.-Lieut. C. P. G. Wakeley, R.N.

Y.—Dr. M. Young, Chester, Capt. F. W. B. Young, R.A.M.C.(T.)

Z.—Dr. T. Zangger, Zurich.

Notes, Short Comments, and Answers to Correspondents.

THE NEED FOR A FOOD BOARD.

AN interesting address was given under the auspices of the Faculty of Insurance at the Central Hall, Westminster, on Thursday, March 27th, by Professor E. H. Starling, Scientific Adviser to the Ministry of Food, on "Food in Relation to Health." Sir Kingsley Wood, M.P., who presided, said that the question of milk supply was under the jurisdiction of no fewer than three Government departments—the Board of Agriculture, the Local Government Board, and the Ministry of Food—and one of the first things to be done was to get the milk supply under the jurisdiction of one Government Department and make one Minister solely responsible to the nation. About 10 per cent. of the milk supplied to the British public contained living tubercle bacilli, and about 40 per cent. of the cow population of the country was affected by tuberculosis. Grading of milk was possible and eminently desirable. Unless some legislation was introduced after the present powers of the Food Ministry had passed away, the whole of the milk-supply of London might be handed over to one vast combine. This was not desirable, and would certainly not be in the interests of a pure supply of milk.

Relation of Food to Health and Industrial Efficiency.

Professor Starling said that in the combat and struggle against disease the most important factor was the power of resistance presented by the body itself, and that power of resistance depended most of all upon food. The greater incidence of disease in the poorer classes had been variously ascribed to bad housing, overstrain, cold, and damp, but these, as shown by the experience of our Army in France and elsewhere, were insignificant when compared with the question of feeding. Our men in the trenches lived under the worst possible conditions of cold, wet, strain, and anxiety, but they lived like fighting cocks, and their health had been excellent—better, indeed, than that of the civilian population. If the body were well nourished not only were the processes of repair rapid, but the individual was in a condition to work effectively and so gain the means to provide himself with food. The chronically starved individual was inefficient and therefore a badly paid worker, so that a vicious circle was established out of which it was difficult for the individual to emerge.

In Germany was seen the result of underfeeding continued over a number of years and culminating in actual starvation; the death-rate had gone up, so that at the present time it was stated that there were 800 more deaths daily in Germany than there were under normal circumstances before the war. The mortality amongst children between the ages of 1 and 5 was double, and those that remained were listless, thin, and anæmic, so much so that play had become a thing of the past. The output of the workman had diminished, nor was there any difference in efficiency between the mental and manual workers. According to Booth and Rowntree, 30 per cent. of our population before the war suffered from chronic underfeeding with all the evils that that system drew in its train.

The object of the Ministry of Food was to see that no man, woman, or child went hungry; that they had sufficient to eat of the right quality and of the right quantity. This would have been of little use had not the Royal Society instituted a committee—the Food (War) Committee—to deal with the questions affecting the nutrition of the nation, so that it was in a position to supply to the Government the data necessary before any successful administrative measures could be adopted.

Quantity and Quality of Food: National and Individual Requirements.

From the Food Controller's point of view man was a machine which must be provided with sufficient fuel in the form of food, not only to do his day's work and to keep himself warm, but also to repair the machine in proportion as it wasted or was damaged with use. For that purpose food had to be sufficient in quantity and adequate in quality. It was thus necessary to determine the quantity needed by the average man, woman, and child, so that the total requirements of the nation could be assessed. A balance-sheet for the country had to be made out as to the requirements and the amount of food available. The average man, of average height and weight, and who was doing an average day's work of eight hours, wanted 3300 calories a day in his food. The average woman wanted four-fifths of the calories required by a man. It was calculated that for the United Kingdom, including its naval and military forces, the requirements for the year 1918–19 would be 49½ billion calories, and of that the home production was estimated to amount to 17 billion calories, leaving 3½ billion calories to be imported in the form of wheat, meat, oil seeds, &c.

The question of the quality of the diet, however, was not exhausted with the provision of an adequate amount of each of the three proximate principals. It was impossible to preserve health unless the food contained vitamines of the three different kinds. A sufficient provision, therefore, of fresh vegetables, fresh milk, butter, or animal fat was essential if the diet were to be satisfactory. The absence of these vitamines gave rise to beri beri, to scurvy, and to deficient growth or rickets. Deficient nutrition was due to the absence of the growth factor which was chiefly found in animal fat, especially milk fat. Our children might be well fed, but if they were not getting fresh milk or butter they might get all those little disorders which were responsible in the main for the enormous number of deaths among children. With a proper system of feeding and the control of proper kinds of food they would reduce the child mortality to the largest possible extent. Attention should be specially directed to the fact that the disorders due to lack of quantity or improper quality of the food did not break out suddenly, but the definite diseases were preceded, it might be by many months, by a diminution of resistance to infection and disease, by minor disorders, and by lack of efficiency. It was this aspect of underfeeding which under peace-time conditions was of the utmost importance in determining the incidence of sickness and the death-rate among the general community.

Need of Continued Scientific and Statistical Investigation.

Professor Starling concluded by drawing attention to the inadequacy of our present knowledge on many of the most important aspects of nutrition. He did not regard the demobilisation of the Ministry of Food without some misgiving. There should be an inquiry or statistics department, which should have knowledge of all food production and consumption. There were questions concerning food and underfeeding to which they had not yet answers. It was a national matter, and some organisation was needed which could inform the Government as to the value of foods, and supply data and statistics on food consumption and distribution. If they were going to decide on a minimum wage they must find out what a man could buy with that minimum wage, and whether it was enough to keep him up to the maximum efficiency for the good of the country. He urged the necessity of creating a Board of Human and Animal Nutrition, which would continue for the public benefit the scientific work which had grown up during the war in connexion with the Ministry of Food. No Government could take any responsibility for the health of the nation unless data and information supplied by some such board were at its disposal.

COLONIAL HEALTH REPORTS.

Jamaica.—A report, prepared by Mr. Robert Johnstone, acting Colonial Secretary, on the Blue book for 1917–18 has been presented to Parliament. From the medical sections of it we gather that the estimated population has dropped from 897,196 to 893,884, a decrease partly due to the departure of certain war contingents. The birth-rate in 1917 was 34·1 per 1000, as compared with 33·3 in the previous year, and the death-rate 26·9 per 1000, as against 22·4. Of the births registered 67·7 per 100 were illegitimate. Comparing the infant mortality with the births during the year, 30,557 infants were born and 7718 infants died at one year of age or under, equal to 25·2 per cent; the percentage under five years of age was 51·6.

Yaws is still very prevalent throughout the island; 8277 cases were treated, various drugs being used. Venereal diseases also continue to be prevalent. During the year an Order was issued to district medical officers in charge of public hospitals, allowing free treatment in such institutions of all cases of venereal disease in an infective condition, and the medical officers were also informed that any specimens of blood, discharge, &c., would be examined and reported on free of charge. In addition to the male venereal ward opened in 1916 two other wards were being built on land adjoining the Kingston Public Hospital. 4361 cases of hookworm were treated at the various hospitals in the following manner: thymol, 3294; oil of chenopodium, 1046; quassia, 15; naphthol B, 6. East Indians were also treated with thymol on the estates; 19 severe cases were treated for hookworm at the General Penitentiary, and 48 examined at the Spanish Town Prison, all of which were infected.

The total number of malaria cases admitted to the hospitals was 4288. The sale of quinine at a cheap rate through the post offices has been continued, and in spite of the very large increase in first cost owing to the war the sale price has not been increased. The District Medical Officer for Kingston states that the disease showed a decrease both in incidence and fatality. The number of cases reported during 1917 as vomiting sickness was 172, of which 158, or 91·86 per cent., were found to be really instances of arsenic poisoning. Dr. H. H. Scott states that the outbreak during the past year has been exceptionally severe, but the mortality is estimated to be now only about 30 per cent., compared with

80 or 90 per cent. in former years, this reduction being attributed to the propaganda issued in the form of pamphlets and notices.

Dr. H. H. Howard, Director of the Rockefeller International Health Board in the West Indies, paid a visit to Jamaica in February, 1918, in connexion with the campaign to be undertaken by that institution for the eradication of hookworm in the colony. The total number of patients treated in public general hospitals and asylums during the year under review was 26,431, and there were 532 deaths. The patients in the lunatic asylum numbered 1637 and in the lepers' home 141. The bacteriologist reports that the investigation into the epidemic of a peculiar nature in St. Catherine referred to in last year's Blue-book has proved it to be an acute outbreak of "central neuritis," which when it has become chronic has for a long time been designated in Jamaica as peripheral neuritis.

THE SAFETY OF PICRIC BRASS PREPARATIONS.

WITH regard to the use of "Picric-Brass Preparations in the Treatment of Lupus," described by Dr. H. A. Ellis and Mr. H. J. Gauvain in THE LANCET of March 15th, the question has been raised of possible risk in the handling of such preparations, for it is well known that the most serious objection to the use of picric acid as an explosive is its acidic character which leads to the formation in contact with metals, and some of their compounds, of picrates, many of which are highly sensitive, the picrates of lead particularly so. Serious accidents have resulted in the use of picric acid, which have been attributed to the formation of these compounds, and for this reason the interiors of shells are varnished. Dr. Ellis tells us, however, that the matter has received the careful attention of the originators. All kinds of experiments were devised to establish the harmlessness of picric brass. It has been burned, boiled, and mixed in all sorts of ways along with many other nitro-phenyl preparations. Dr. Ellis goes on: "All this confirms what chemists tell me, that there is no risk from picric acid in the open. The result might be different were brass preparations to be put in an enclosed space with copper or if ammonium picrates were employed. Chemical action might then produce an unstable compound. In applying picric brass I always use a wood or glass instrument simply to avoid any possibility of impairment of the activity of the preparation, but the oil present would in itself probably prevent any change except at the immediate site of contact."

THE CHILD AS AN IMPEDIMENT.

LAST week an application for an ejectment order was made in a London police-court, admittedly on the ground that the tenants had a baby and that the baby-carriage damaged the linoleum. Nevertheless signs are not wanting that healthier views may prevail with regard to the place which the child holds in the community. Knowledge, and legislation founded on that knowledge, will, however, still be necessary to avert the danger threatening any State which neglects its child life. The advertisement for married couples "without encumbrances" is less often seen than it used to be, but it is still difficult in some neighbourhoods for a working man who has more than one, or perhaps two, children to obtain a house or apartments, whilst members of the middle class often fare no better. We understand that in New York the Board of Aldermen, which corresponds to our London County Council, has, at the instigation of its General Welfare Committee, brought in a Bill prohibiting landlords from refusing to accept tenants with children in any building used for dwelling purposes under a penalty of a £50 fine or five days' imprisonment, or both. This should have a salutary effect upon a practice which is injurious to the welfare of the community, and if it becomes law we hope that its beneficent results will be reflected in this country. The need for such a law is probably as great here as in New York.

THE CARRIAGE OF PERISHABLE FOODS.

THE Food Investigation Board (Department of Scientific and Industrial Research) have had before them for some time the very important questions of the construction and design of refrigerated railway cars, with the view of improving the existing methods of transport of perishable foods. They have now issued an interim report, which, presenting the results of their experiments, indicates the direction in which such a service of transport can be made more efficient. They found, for instance, that the insulation of none of the cars was so effective as is desirable, and suggest that improvement can be made, both in existing cars, and especially in cars which have to be constructed in future. They also find that the deficiency in the air-tightness of the cars is a serious matter, especially as regards the fitting of the doors. This, in their opinion, should be remedied in the existing cars, and proper provision for air-tightness should be made in all those which yet remain to be constructed. In regard to the provision of ice-tanks in the cars, the present size of these tanks may be adequate, but it is concluded that the practice of icing them is altogether inefficient, and steps should be taken to insure improvements on these points. These conclusions are discussed in detail in the report, and the recommendations following are most valuable in their bearing upon the wastage of perishable food through defective methods of transport.

NEW DESIGNS IN SURGICAL APPLIANCES.

SIMULTANEOUSLY with a change of title and address, Messrs. Mayer and Phelps (formerly Messrs. Mayer and Meltzer, the well-known surgical instrument makers, of Great Portland-street) have issued a descriptive supplementary catalogue of recent surgical instruments and appliances from their new premises, Chiron House, 59 and 61, New Cavendish-street, London, W. 1. In addition to recent designs of surgical instruments, the list includes the instillation apparatus for use in Carrel's method in the treatment of septic wounds, mensuration instruments designed for the Red Cross Clinic for the physical treatment of disabled soldiers, and a new apparatus for the intratracheal insufflation of ether.

WANTED, A BUNGALOW.

To the Editor of THE LANCET.

SIR,—I have had to retire from practice owing to chronic asthma and can hardly manage to mount stairs. Will some of your readers be so kind as to tell me of a sheltered place where I could rent or buy a small bungalow or house? Two rooms, convertible into bedrooms, besides a sitting-room and lavatory, are necessary, on the ground floor. Not too far from London and accessible. I should be deeply grateful for help. I am obliged to move before June 24th.

I am, Sir, yours faithfully,
GEORGE W. ORD, M.R.C.S., &c.

25, De la Warr-road, Bexhill-on-Sea, Sussex, March 31st, 1919.

OSTEO-ARTHRITIS.

IN comment upon a letter appearing under this heading in our issue of March 15th a correspondent suggests that it will be found on examination of the abdomen that the right side is a little more full and tense than the left, and that if deep pressure is exerted over the cæcum tenderness will be apparent. More than one correspondent writes to point out the connexion between arthritis and fermentative changes in the cæcum and ascending colon; one suggests as a remedy to knead this part of the abdomen for a quarter of an hour morning and evening.

A. B. C.—The point recently came before the Royal College of Surgeons of England, and a ruling was then given by the President:—"It appears to the President reasonable and proper that a medical officer, on being demobilised and returning to civil practice, should announce his return to his patients by means of a notice in the newspaper press. The President, however, thinks that the announcement should be in the form of a paragraph, for which payment might be made, rather than in the form of an advertisement, and that one or possibly two insertions of the notice in not more than three newspapers should suffice."

Communications relating to editorial business should be addressed exclusively to The Editor of THE LANCET, 423, Strand, London, W.C. 2.

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